AUGUST 6, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

Shot Peening

How Effective Is It?

—see page 72

NEW INVESTMENT TREND
—Hope for Little Companies, p. 45

QUARTERMASTER BUSINESS
—Down Metalworking's Alley, p. 54

REVOLUTIONARY MACHINES
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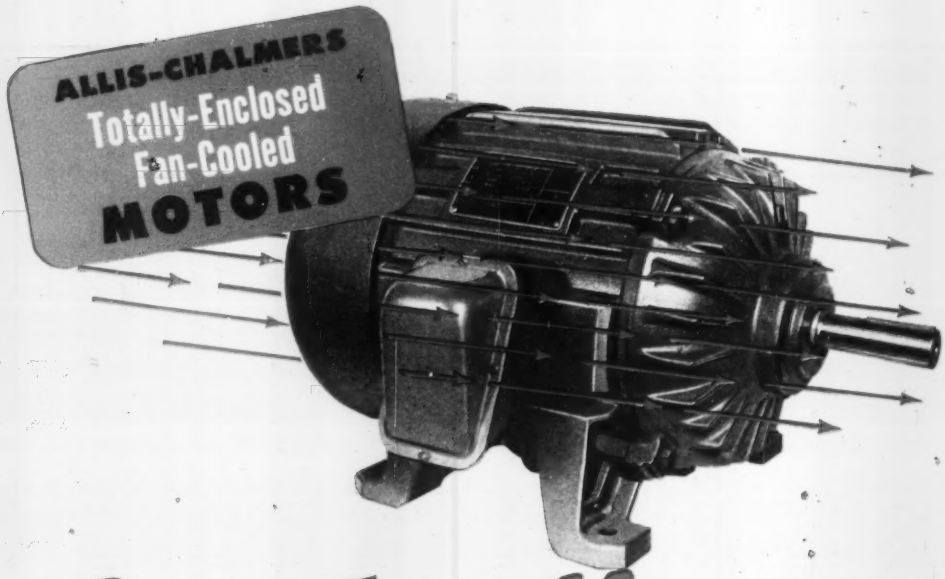

GET THE MOTOR that Cleans Itself

DROP YOUR MAINTENANCE COSTS to a new low by reducing motor cleaning operations and reducing inspections and overhauls. Tests have proved that on most applications totally-enclosed, fan-cooled motors more than pay back their extra cost in reduced maintenance. And this new Allis-Chalmers Type APZ tefc motor makes maintenance costs lower than ever before on this type of motor.

Here's Why

Concealed air passages and pockets have been eliminated; dirt cannot build up to cause overheating. Cooling air is blown over the ribbed cast iron frame and bearing housings carrying dirt away with it. How about oily dirt that sticks? It can be wiped or blown off without stopping the motor.

Rigid Construction

The frame is rigid cast iron which not only has high inherent corrosion resistance, but also holds bearings in alignment. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Dealer or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B6144. A-3398

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Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

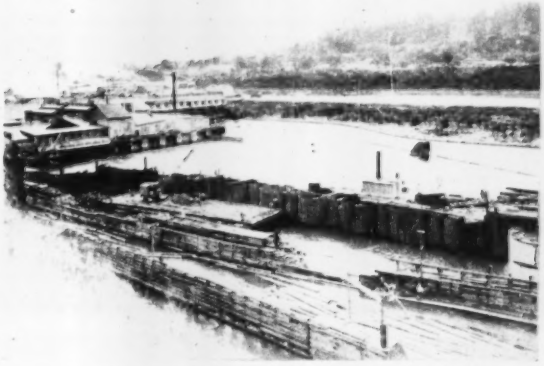
New Construction in West Takes Variety of Steel Products

AMERICAN CAN BUILDING—Located at Sepulveda Boulevard and Main Street in the harbor area of Los Angeles, this new building will serve as a container factory and office building for American Can Company. It is to be a one-story structure with 249,000 sq ft of floor space.

The 800 tons of structural steel required here were fabricated and erected by Bethlehem Pacific. General Contractors: Lindgren & Swinerton, Inc., Los Angeles.

ALASKAN WAY VIADUCT—Cutting through the city of Seattle, this 2-deck reinforced-concrete freeway will expedite the flow of northbound and southbound traffic on U. S. Highway 99. Four interchanges will be provided in this 2¼-mile structure, in addition to the entrances at each end.

Approximately 1500 tons of Bethlehem Pacific reinforcing bars have been furnished for this viaduct unit. General Contractors: MacRae Brothers, Seattle. Engineering by the city of Seattle. Construction supervision: Washington State Highway Department.



CROWN-ZELLERBACH BULKHEAD—Pulp logs used in the manufacture of paper will be stored in this basin on the Willamette River at West Linn, Oregon. Essentially a cellular bulkhead, this 650-ft structure is an interlocking line of sheet-piling cells driven into the river bed. The finished cells are to be filled with quarry-run rock.

Bethlehem Pacific furnished the 600 tons of steel sheet piling used for the cell walls. General Contractor: L. H. Hoffman, Portland.

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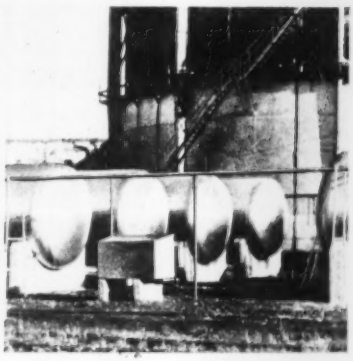

FOR PUBLIC UTILITIES.

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RESEARCH KEEPS . **B.F.Goodrich** FIRST IN RUBBER

Where a change to B. F. Goodrich grommet belts saved $100 a week

B. F. Goodrich grommet V belts cut costs 20 to 50%

WHAT would you do if you were spending $100 a week to replace failing V belts on one drive? That was the case in this mill — ordinary V belts failed in a week or less. They couldn't carry the terrific power-load.

The company called in the BFG sales engineer and B.F.Goodrich grommet V belts were installed. That was 5 months ago and the grommet belts look as good today as the day they were installed. Here's why:

Endless — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping cord sections. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless grommet belt eliminates such failures.

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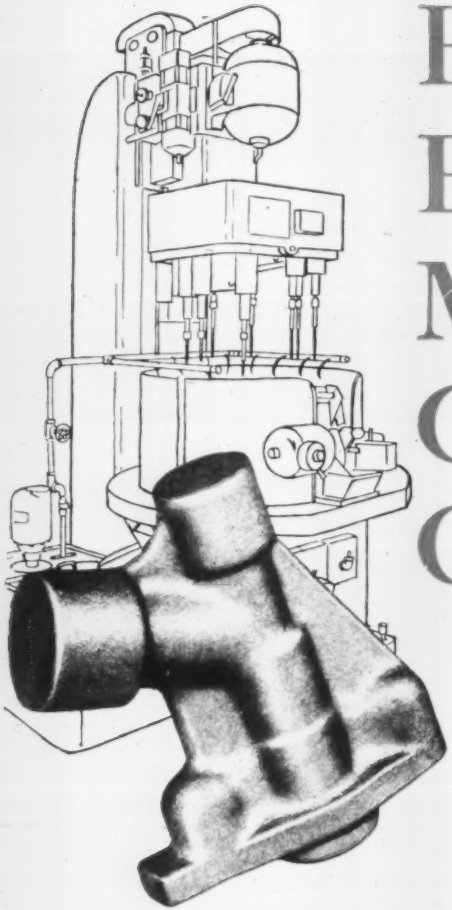
Better grip, less slip — Because a grommet is endless, a grommet belt is more flexible, grips the pulleys better. Size for size, grommet belts will give 1/3 more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet! — No other multiple-V belt is a grommet belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B.F.Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet Belts BY

B.F.Goodrich

RUBBER FOR INDUSTRY



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STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 6 AUGUST 6, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 182. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week . . . **Gears—Musts for Meshing Industry . . . Heat Resistant Ceramic Coatings Broaden Low Carbon Steel Applications . . . 20mm Fuze Noses Zinc Die Cast at High Speed . . . Forgings Descaled 90 Per Cent Cheaper**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10, two years $15, all other countries, one year $18. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

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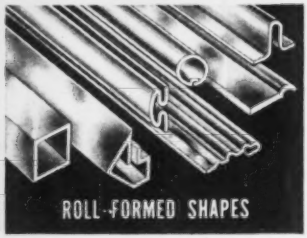

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Behind the Scenes...

Problem in Paint

The editorial precincts upstairs are being painted, and some of the boys who put this book together are being forced to write their copy at makeshift desks in the halls while workmen cover their office walls with a restful shade of green.

One thing good came out of the upheaval. The editors noticed the marked number of different painters that appeared on the job. That was one of the factors that inspired them to look into the skilled labor situation for metalworking. The findings will appear in an article—Skilled Labor—How To Get It, How To Keep It—scheduled for a late August issue.

Taxes in Texas

The Texas legislature said it was doing the tax payers a good turn in rounding off the cumbersome 4.5375 per cent tax on oil production to an even 4.6 per cent. Good turn, indeed. At present prices and production levels, the convenience will cost taxpayers $1.5 million additional a year.

Cover Story

The excellent photograph on the cover this week was taken by Harry McDevitt, a staff photographer of the Ford News Bureau. Shot peening pictures, the editors discovered, were not the sort of thing many industrial photographers have handy in their files. The editors asked Kenneth Gregory, one of the big wheels of the bureau, for advice, and he immediately offered to have Harry take some samples at the Ford plant. In two days, Harry came through with a whole set of first-rate shots, one of which graces the cover.

The cover refers to a story on shot peening developments that begins on page 72.

Reader

In our mail has just come an epistle from the Office of the President of the United States. Mr. Truman, or maybe one of his secretaries, wants a copy of the yearbook issue that appeared Jan. 1, 1951.

Restless Readers

One of the problems all publishers have to cope with is the restlessness of America. In just six months from Jan. 1 to June 30, 1951, STEEL had to make more than 10,000 changes in its mailing address plates for the copies it distributes. Names were added, names were dropped. Companies moved, changed their names or went out of business. An officer in a company shifted from vice president to president, so that change was duly recorded.

If a magazine with a specialized distribution like STEEL has 10,000 changes in six months, consider what a mass circulation publication like *Life* must have.

Deadline

The summer holiday season is definitely on. During a reconnoitering session in the editorial precincts a while back, we knew that the peak had come. Pasted on Engineering Editor Walt Toerge's door was this sign: "Keep out. This man has a story to edit before starting his vacation at 5:15."

Puzzle Corner

A semiretired merchant, living on East 12th street, New York, owns two stores, one located on Wall street and the other on 42nd street. It is his custom to visit each store once a day, five times a week—Monday through Friday.

After a late breakfast he saunters over to the subway station at 14th street. He has no set schedule, but usually arrives there between 9 and 10 o'clock. He goes to the express platform, where on one side the trains run uptown toward 42nd street, and on the other downtown toward Wall street. The number of trains per hour arriving here in each direction is equal. The merchant is not particular which store he visits first. He simply takes the first train that comes along.

The peculiar thing is that 80 per cent of the time he goes downtown. Why?

The egg problem of July 23 was another one of those multiple answer deals. The ratio of the price per odd egg to the price per dozen is 3 to 1. Thus, eggs can sell for $1 a dozen and $3 per odd egg, 10 cents per dozen and 30 cents per odd egg, etc.

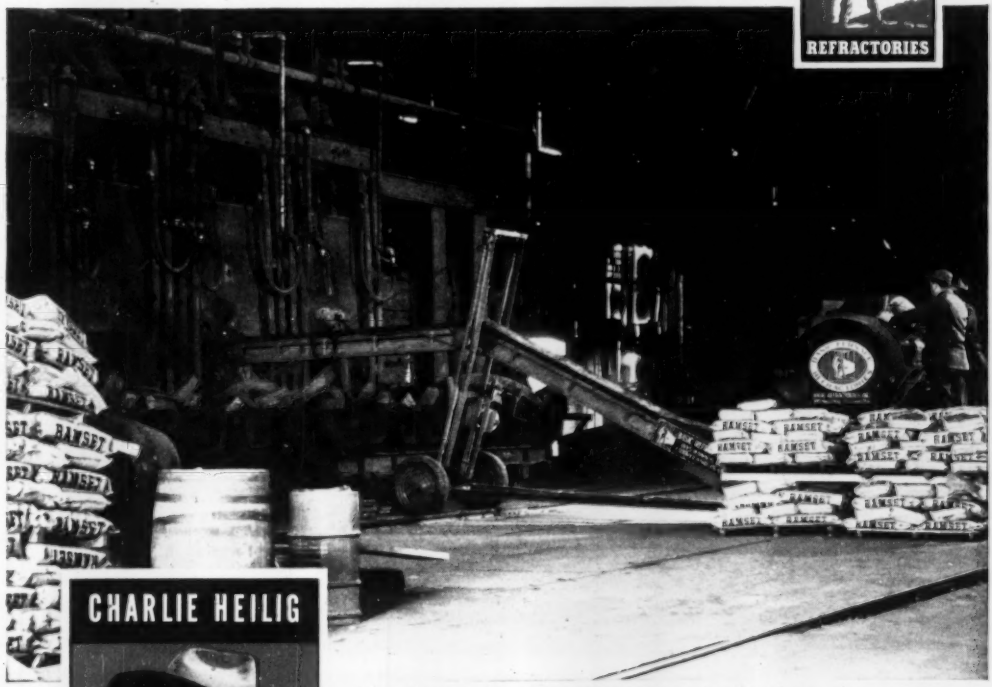
First in to point that out were Charles J. Luhn, Joseph Honhorst Co.; Herman Balsam, Titon Tool Works; Ralph Lysek, Donley Brothers Co.; Ralph Pappenheimer, Specialty Device Co.; Mrs. Gene M. Champion, Hamilton Scale Co.; and V. C. Ward, Great Lakes Steel Corp.

Shrdlu

(Metalworking Outlook—Page 35)

Basic values behind the trade mark

BASIC FURNACE REFRACTORIES



Special Service Division equipment in use on a Ramset hearth installation.

Charlie Heilig, manager of the Basic Service Division, joined the staff in 1944, with 23 years' experience in steelmaking, including years as an open hearth superintendent.

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May we apply the proven excellence of Sterling's New Roll Grinding Wheels to your most troublesome problem? No obligation. Write us today for a wheel test on your machines.

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Tested in the leading steel mill roll plants, Sterling's new wheels showed superior grinding ability. Sterling's 30x3x12 wheel, specification KA 801 K13 B3, used on alloy steel, cold mill reduction rolls, had the complete approval of all six operators on the test machine. This specification produced more than $2\frac{1}{2}$ times as many rolls as were previously secured from other grinding wheels on the same job!

Sterling Engineers, skilled in recommending correct wheel specifications for your specific grinding project, can suggest the proper "Wheels of Industry" to solve any such problem quickly and accurately.

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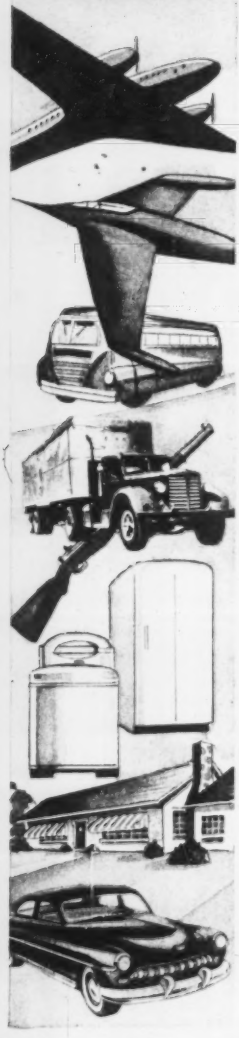

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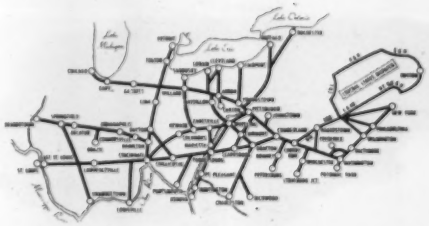

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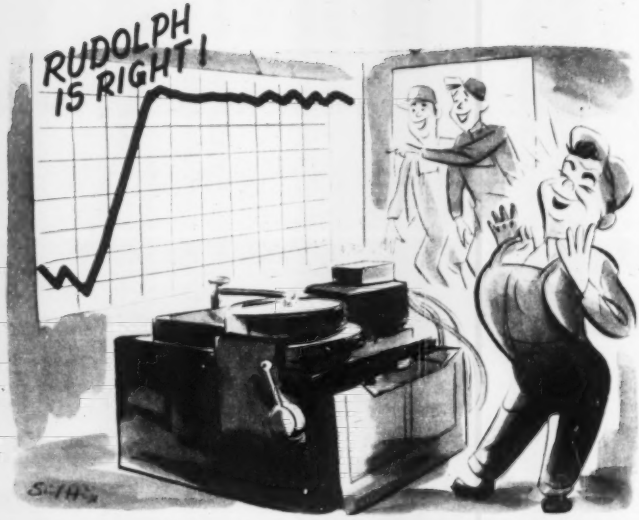

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Stuart combines theory and practice to give you the right cutting fluid for the job. Here is an example:

In a large gear department, cutting fluid tests were run on Gleason Revacycles cutting 8620 gear stock, 179 Brinnel hardness.

	"X" Oil	Stuart's SPEEDKUT "A"
Gears Per Tool Grind	1200	3200
Stock Removal to Recondition Cutters	.009"	.0035"
Price of Cutting Oil	33c/gal.	35c/gal.

There's a story! More production because of less downtime. Longer cutter life because of fewer grinds and less stock removal per grind. A lower *actual cost* for the cutting fluid.

You can get help like this from a Stuart Representative. Ask to have him call.

Are you receiving Stuart's Shop Notebook regularly? Write, wire or phone

GET MORE PRODUCTION Use The Right Cutting Fluid

STUART SERVICE *Goes with every Barrel*

Offices in Principal Industrial Centers

D.A. Stuart Oil CO.

2735-37 S. Troy St., Chicago 23, Illinois

LETTERS TO THE EDITORS

Titanium: The Latest Venture

Under the headline, "Another Titanium Project," (July 9, p. 71) STEEL reports a new organization will reduce titanium on a production basis. Can you send the company's name?

J. P. McGuan
5131 S. Maplewood Ave.
Chicago

• *We referred to Horizons Titanium Corp., formed from Horizons Inc., Princeton, N. J., and Ferro Inc., Cleveland. For more details on the venture, see STEEL, July 30, p. 37.*

Broadening Contacts

One of my associates shortly will have a production of two tons a day of powdered iron of 100 to 200 regular mesh, that can be reduced to 300 mesh 99.97 per cent pure.

In searching for markets, I have already contacted William Frost Co. Inc., New York, the Los Angeles Chamber of Commerce and the chief, Iron & Steel Division, National Production Authority. We will appreciate any other market information you can furnish.

C. B. Edington
Southern Steel Co.
Los Angeles

• *The three largest users of powdered iron in the U. S. are: Moraine Products Division, General Motors Corp., Dayton, O.; Amplex Division, Chrysler Motors Corp., Detroit; and Michigan Powdered Iron Products Inc., Northville, Mich. We also suggest you write to Metal Powder Association, 420 Lexington Ave., New York 17.*

Strenuous Exception

I was very interested in your article, "Quality Control—It Helps Small Plants Too," (July 16, p. 74). I enjoyed the entire article, but take strenuous exception to the last sentence—"Be prepared to wait two years or more before you get concrete results."

. . . when we want immediate results in quality control we institute statistical methods. When it is necessary to get out of trouble NOW, we find that statistical methods work faster and get quicker results than any other kind of investigation.

J. Manuele, director
Headquarters Quality Control
Westinghouse Electric Corp.
Pittsburgh

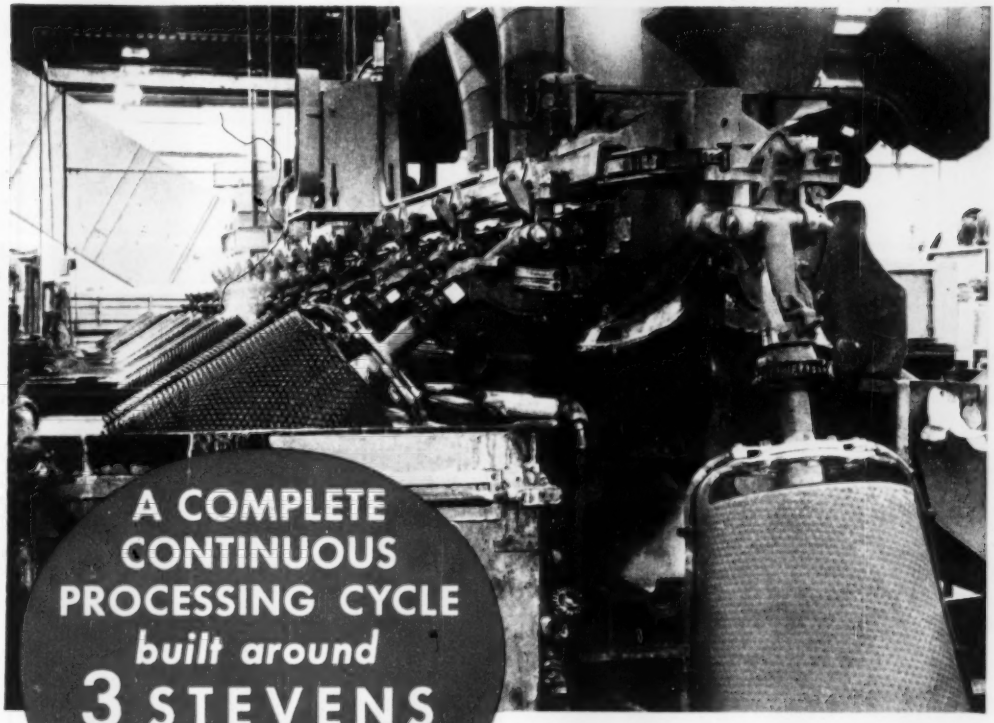
• *We didn't intend to imply that it takes two years or more to get concrete results from a statistical quality control system—once the system is well established. We were trying to point out that it may take two years or more to get it established.*

Interest in "STH"

Please send us the name and address of the manufacturer of the new soluble cutting tool known as "Emulsifier STH" (STEEL, June 25, p. 109).

A. B. Hourin
Schrade Walden Cutlery Corp.
Walden, N. Y.

• *Manufacture, General Aniline & Film Corp., 22 Center Square, Easton, Pa.*



A COMPLETE CONTINUOUS PROCESSING CYCLE *built around* 3 STEVENS *AUTOMATIC* PLATING MACHINES

Shakeproof, Inc., Elgin, Illinois, is realizing new operational economies with their Stevens Full Automatic installation for complete processing of small, stamped and cold headed fastening devices. The entire processing cycle is automatic and includes cleaning, plating, rinsing, bright dipping and drying. Two Stevens Full Automatics are used for zinc and cadmium plating while a third Stevens unit is used for phosphatizing parts requiring such treatment.

According to Shakeproof, their Stevens continuous processing installation gives better control of plating thicknesses, fewer rejects, cleaner operation with reduced operating manpower requirements, and absolute minimum material handling costs because of its straight-flow operation.

You can bring these same benefits to your plating operations with Stevens equipment. Stevens Full Automatics are *designed* to fit in with continuous automatic materials handling installations. Indexing controls can be easily adjusted to meet virtually any processing requirement. Maintenance is held to a minimum. Have your Stevens representative show you all of the advantages offered by Stevens Full Automatic Plating Machines. Or, write direct to *Frederic B. Stevens, Inc., Detroit 16, Michigan*, for full details. There's no obligation.

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B. STEVENS INCORPORATED

BRANCHES • SALES OFFICES

BUFFALO • NEW HAVEN • MINNEAPOLIS • CLEVELAND

Representatives in Principal Cities

DETROIT 16, MICHIGAN

FREDERIC B. STEVENS OF CANADA, LTD.

WINDSOR • TORONTO

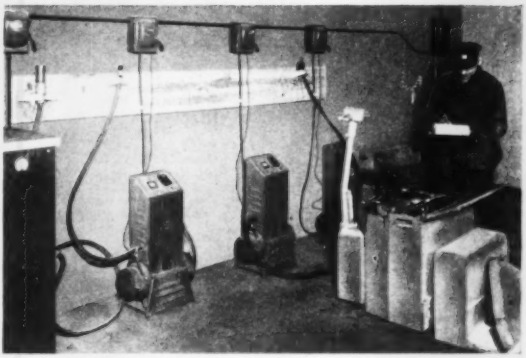
ONTARIO

GOULD

Plus-Performance Plan

. . . SHOWS YOU HOW

CORRECT CHARGING EXTENDS BATTERY PERFORMANCE!



Charging rooms should be planned to make charging and handling convenient and economical.

Right now, the problem of conserving and extending essential battery power is urgent. Timely help is offered you by the GOULD PLUS-PERFORMANCE PLAN which can improve battery performance as much as 50%! Here is a complete system of manuals, articles, specifications, bulletins, record cards and charts which explains and illustrates how to select, charge and handle, maintain and determine the condition of your batteries.

The material comprising the GOULD PLUS-PERFORMANCE PLAN is available to battery users without obligation. A request on your letterhead will bring descriptive literature by return mail.

The Gould "Thirty" with "Z" Plates—America's Finest Industrial Truck Battery

FOUR SIMPLE CHARGING RULES SAVE POWER

1. Do not overcharge. Use 22.5 amperes per 100 ampere-hours of battery capacity for 80% of charging time. Finish charge at 5 amperes per 100 ampere-hours. Correct charging will not cause gassing or overheating.
2. Give periodic equalizing charges. An extra 4-hour charge at the recommended finish rate at least once a month but not more often than once a week makes sure all cells are up to full charge.
3. Keep idle batteries charged. Batteries not in use should be given a freshening charge once every three months to prevent internal discharge, sulphating and eventual loss of efficiency.
4. Inspect charging equipment regularly. Make sure it is set correctly for the size of batteries to be charged. Inspect voltage relay timers frequently to assure accurate automatic cut-off. If ampere-hour method is used, check ampere-hour meter charts for correct settings.

GOULD

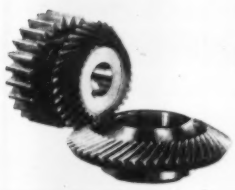
STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

TESTING might mean only cursory examinations or spot checks along the production line. But that is not good testing. Here—at BRAD FOOTE—men with skilled hands using modern precision instruments test constantly, during every step of manufacture. They realize that the responsibility of satisfying you, our customers, rests primarily with them. They know that *"No one shares our responsibility."*

• Our method of testing dimensions, hardness and soundness of metal structures, and smoothness of finish is part of our system of complete control. It means that the BRAD FOOTE gears you buy for use on equipment you sell to others—or for use in your own shop—will give satisfactory service.



BRAD FOOTE GEAR WORKS, Inc.

Bishop 2-1070 • OLympic 2-7700 • 1309 South Cicero Avenue
Cicero 50, Illinois

WHY IT PAYS

to reclaim worn forging dies with "HASTELLOY" Alloy C

Trade-Mark

Rebuilt Dies Often Last Longer Than New Ones:

Besides eliminating the total loss of scrapping a worn forging die, rebuilding dies with HASTELLOY alloy C frequently makes them last longer than new ones. Most shops have found that repaired dies last 2 to 3 times longer than the original metal. Also, when a reclaimed die finally does wear, it can be machined and faced again.

HASTELLOY Alloy C Is Easy To Apply:

Alloy C rod can be easily applied to the worn contour and part lines of old forging dies. Preheating is seldom necessary except to speed welding of very large dies. The rod can be applied to any of the common die steels by arc welding.

Deposits Are Machinable:

When deposited, HASTELLOY alloy C has a hardness of about 200 Brinell. It can be machined by any of the common diesinking tools. Grinding is not necessary.

Peening Is Eliminated:

There is no need to peen or hammer a HASTELLOY alloy C deposit. Deposits work-harden in service to from 325 to 375 Brinell and have excellent resistance to chipping and spalling.

For further information on rebuilding worn forging dies, get in touch with the nearest Haynes Stellite Company district office. Ask for a copy of the new "Haynes Hard-Facing Manual," which tells how to apply HASTELLOY alloy C and many other HAYNES hard-facing rods.

HAYNES

TRADE-MARK

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

"Haynes" and "Hastelloy" are trade-marks of Union Carbide and Carbon Corporation.

OVERLOAD PROTECTION

FOR SMALL MOTORS

COMPLY WITH THE NATIONAL ELECTRICAL CODE

by using the Approved Bulletin 600 Starting Switch

Toggle lever switch with cover removed

Key operated for public places

For hazardous gases

For waterproof service

It looks like an ordinary snap switch . . . but something has been added . . . a self-contained thermal overload breaker. The heater element quickly detects an overload on the motor. It releases a soldered ratchet . . . the contacts snap open, automatically.

The motor is thereby disconnected before a burnout can occur . . . and it cannot restart until the toggle lever is flipped down manually to reset the overload breaker. If the overload persists, the contacts cannot be held closed by the operator.

This compact starter, rated at 1 hp, 110-220 v, is a favorite with engineers who want a small, inexpensive switch to protect fractional horsepower motors. Send for Bulletin 600.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wisconsin

5-51-MR

A-B Quality

ALLEN-BRADLEY

BULLETIN 600 STARTING SWITCHES

QUALITY

BIG NEWS

ABOUT A SMALL SWITCH
that provides
OVERLOAD PROTECTION
for motors up to
1 hp, 110-220 v, a-c
and
¾ hp, 110-220 v, d-c

Here is an 8-page illustrated bulletin, filled with engineering data on the various types and forms of Bulletin 600 starters now available to you.

Below are a few of the many convenient standard enclosures for different service requirements.

This handy reference booklet is a quick guide for busy engineers. May we send you a copy?

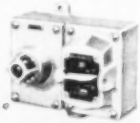
Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wisconsin

BULLETIN 600 MANUAL STARTING SWITCH for SMALL MOTORS

Two starters in one enclosure

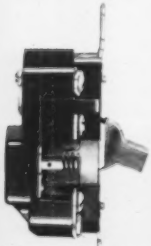
Starter with selector switch

Starter with pilot light


Watertight starter with pilot light

In standard wall box

AVAILABLE IN ENCLOSURES FOR EVERY APPLICATION

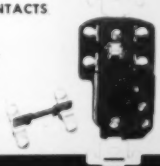

Side view of starter, showing heater element coiled around the stud.

THERMAL OVERLOAD BREAKER

Soldered ratchet of overload breaker is mounted on a heater stud. Around the stud is the coiled thermal element which heats the stud. Overload melts the solder; ratchet is released. This automatically opens switch with snap action.

DOUBLE BREAK SILVER ALLOY CONTACTS

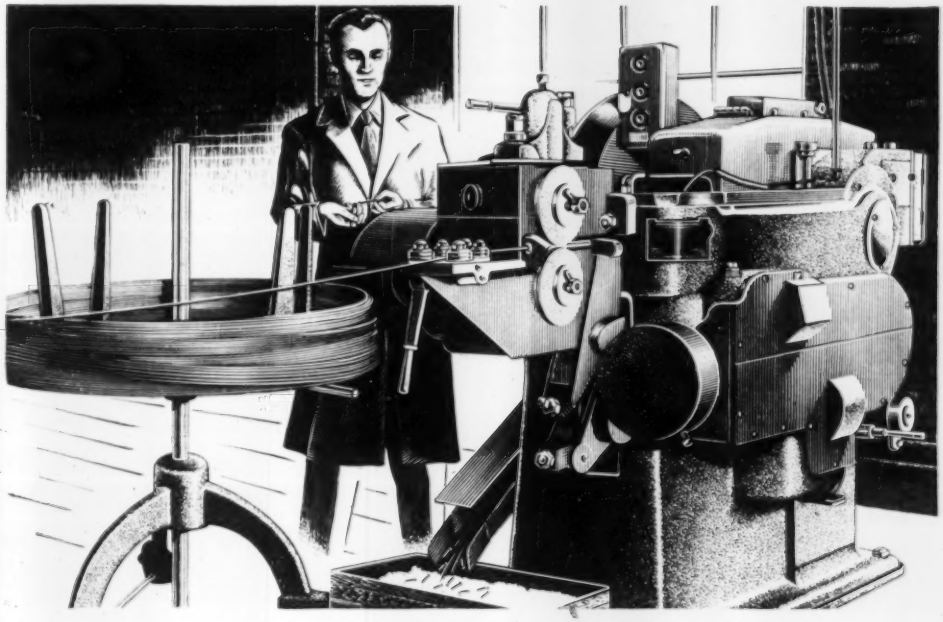
Switch contacts are quick make, quick break. In the 2 pole construction, each side of line has two stationary contacts bridged by the double moving contacts. They need no contact maintenance, because they form no insulating oxides.



5-51-R

A-B Quality

ALLEN-BRADLEY
BULLETIN 600 STARTING SWITCHES
QUALITY



Get maximum output with Scovill extruded cold-heading wire!

Uniformity and soundness are the basic reasons why Scovill *extruded* cold-heading wire (cartridge brass, 70%) goes further.

This wire is hot extruded from billets which are made by Scovill's unique *continuous-casting* process to secure maximum uniformity of composition and freedom from internal defects. Scovill's precision drawing and annealing operations assure uniformity of finish wire tempers to suit your specific cold-heading applications.

You save labor . . . uniformity means no tool re-setting during runs. You save brass . . . uniformity means accuracy, no waste. Faulty cold-heading, due to the material used, is at a minimum when you use the proper temper of Scovill *extruded* cold-heading wire. No split heads or shanks, out-of-round heads, scanty filling-out of heads and shoulders, or rough "orange-peel" effect.

Credit this fine wire to Scovill's foresight after World War II in modernizing its Wire Mill. Though Scovill's capacity is increased, so is demand . . . at a time when raw-materials (copper, zinc, etc.) are relatively short.

While you can't always get Scovill *extruded* cold-heading wire, when you do, you'll find "You Can't Buy Better Brass." It assures maximum output of cold-headed brass parts from uniform wire with your required "flow" characteristics (for heading and extruding) or of essential rigidity (for heading and drilling).

"You can't buy better brass"

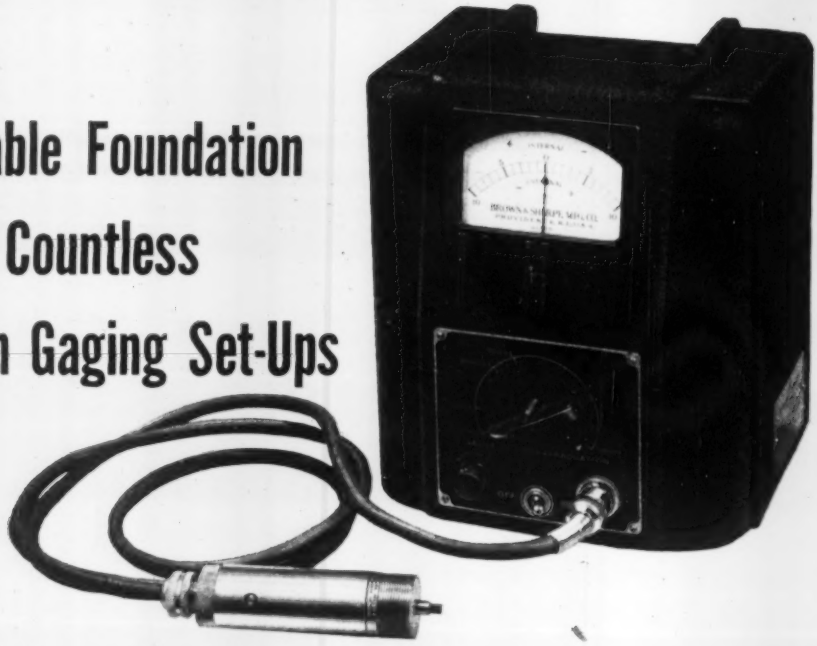
SCOVILL

A PRODUCT OF SCOVILL

For complete information, contact: **SCOVILL MANUFACTURING COMPANY,** 83 MILL ST., WATERBURY 20, CONN.

BRASS MILL PRODUCTS IN A COMPREHENSIVE RANGE OF COMMERCIAL ALLOYS, SHAPES, TEMPERS AND SIZES

Adaptable Foundation for Countless Precision Gaging Set-Ups



TYPICAL APPLICATIONS

Special gaging fixture made by Brown & Sharpe for inspecting dimensions, side parallelism and side squareness of cutter blades. Employs 4 Gage Head Cartridges . . . used with 4 Amplifiers.

Special gaging fixture, custom-made by Brown & Sharpe, permits gaging of meter valve plate flatness to .00001", when used with Brown & Sharpe Amplifier.

Custom-made fixture, employing Brown & Sharpe Gage Head Cartridge and one Amplifier, measures major and minor I.D.'s of tapered bores; indicates internal angle accuracy.

Brown & Sharpe Gage Head Cartridge and Electronic Amplifier

Here's a really practical basis for versatile precision gaging equipment at reasonable cost.

The Brown & Sharpe Gage Head Cartridge and Electronic Amplifier provide accurate gaging, with direct-reading indications, in units of .0001" to .00001". Simple jigs or fixtures to hold the cartridge for many special gaging jobs can easily be built in your own plant. By shifting the same cartridge among a number of fixtures, you can do precision gaging of practically any length, diameter, or other dimension — with minimum investment in equipment.

Both the Gage Head Cartridge and the Electronic Amplifier are built for severe service conditions. The dustproof, moisture-proof cartridge can be safely exposed to abrasives or coolant. Write for complete literature on this multi-use precision gaging equipment. Brown & Sharpe Mfg. Co., Providence 1, R. I., U.S.A.

WE URGE BUYING THROUGH THE DISTRIBUTOR

B·S

Brown & Sharpe

We Sell the Wire . . .
We GIVE the Service

STEEL MILLS
NEED SCRAP
BECAUSE YOU
NEED STEEL

Making wire that will work for our customers . . . that's our job at Continental. These wire users know when they place their wire requirements with us that they can depend on Continental's interest and ability to supply them with exactly what they need in temper, finish, or special shapes. They know they can expect the type of close, personal service that often results in the saving of both time and money. That's why year after year they select Continental as their chief source of supply for wire.

Shaped Wire . . . For Parts or Trim

Many Continental wire customers save money, add sales appeal to their products by using the right shaped wire for basic parts or exterior trim. Providing wire in special shapes is another Continental service for its customers.

Trade Marks Reg. U.S. Pat. Off.

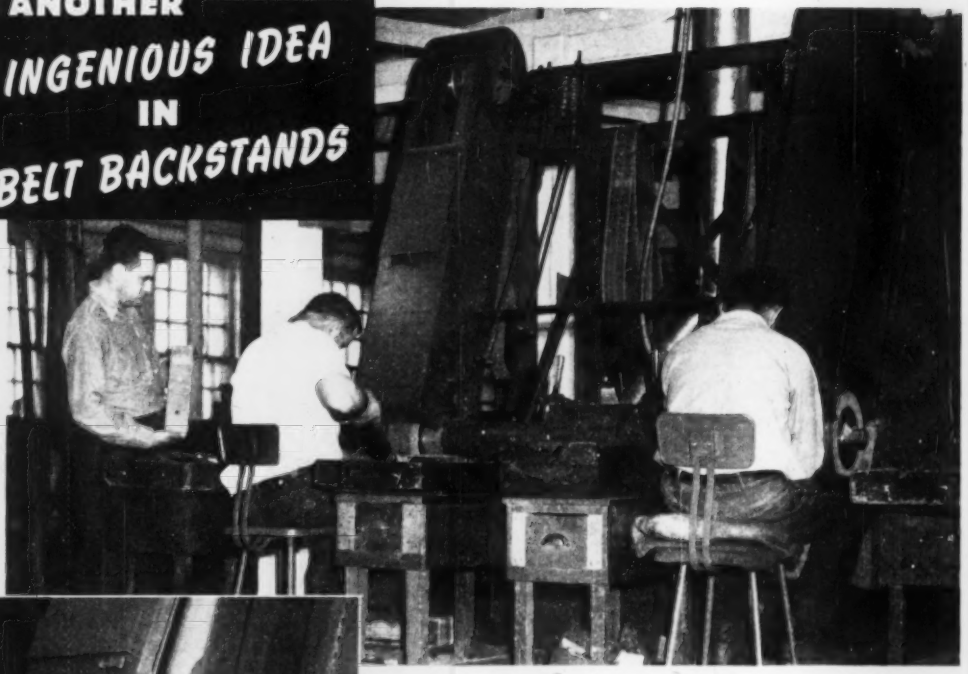
CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

ANOTHER INGENIOUS IDEA IN BELT BACKSTANDS



Close-up of finishing on a door-plate, initial and final operations entail simply a quick move from one belt to the other.

Photographs by Coale Pictures, Berlin, Conn.

The profit-saving advantages of finishing with BEHR-MANNING abrasive belts, are doubly realized in this backstand arrangement at P. & F. Corbin, Division of The American Hardware Corp., New Britain, Conn., prominent manufacturers of building hardware. Here are the big points:

1. **A TWO-MOTORED LATHE,** so the operators work independently, and stoppage of one does not stop the other —
2. **TWO CONTACT WHEELS** and belts (rough and finish) at each end of the lathe. Belts are only a few inches apart, making the roughing and finishing almost a single operation on each piece —
3. **BACKSTANDS ARE RAISED ABOVE,** instead of extending back of contact wheels. The supporting structure is mounted on the lathe itself. Valuable floor space is saved.

This ideal arrangement was devised by Mr. Max Grapski, the company engineer, with the cooperation of a BEHR-MANNING Engineer.

ARE YOU HANDLING your finishing operations the most profitable way? Why not utilize the experience of BEHR-MANNING Engineering Service. No obligation. Write to Dept. S-8.

BEHR-MANNING®
NORTON abrasives

BEHR-MANNING • TROY, N. Y.

COATED ABRASIVES • SHARPENING STONES
PRESSURE-SENSITIVE TAPES

EXPORT: BEHR-MANNING OVERSEAS INC., NEW ROCHELLE, N. Y., U. S. A.

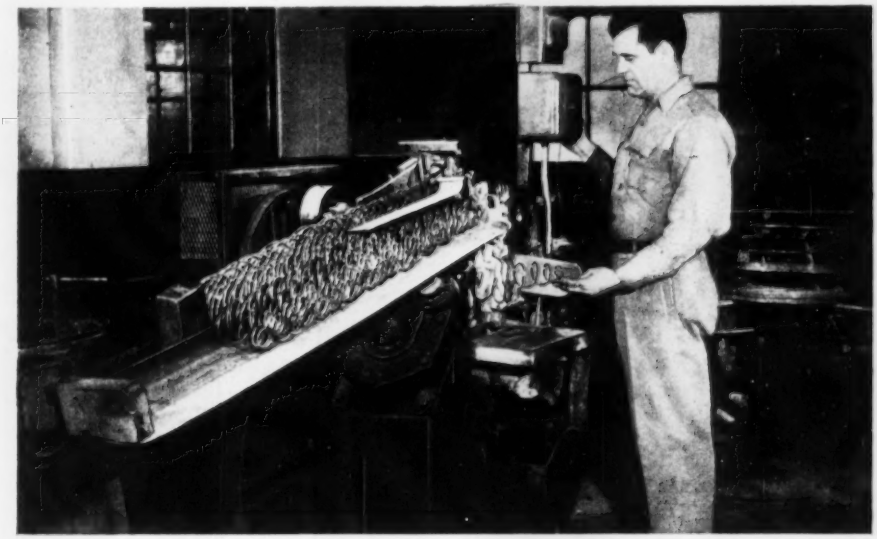
SPRING WIRE

Roebling is one of America's largest manufacturers of specialty wire

ROEBLING MAKES a full range of Spring Wires to meet almost countless purposes. There's upholsterers' spring wire. There's a wide variety of mechanical spring wires, including hard drawn, soft, annealed or oil-tempered M.B., H.B., and Extra H.B. spring wire; music wire, and valve spring wire . . . available in a large range of physical properties and finishes.

And on top of that, from open hearth to finished wire, all manufacturing processes are carried out in Roebling's own plants where positive control assures highest uniform quality at all times. From end to end, Roebling Spring Wire is identical in gauge and finish, in mechanical and metallurgical properties . . . saves preparation time for users . . . brings faster, smoother production.

Large quantities of Roebling specialty wire are required in today's rearmament program. You can count on us, however, to make every effort to meet your delivery requirements, always. John A. Roebling's Sons Company, Trenton 2, New Jersey.



ROEBLING

Atlanta, 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***

Introducing ...

The New Forging

HIGH SPEED FORGING MAXIPRESSES are making an ever-growing percentage of the world's forgings. Their advantages over old-fashioned equipment include:

1. Low operator skill requirement
2. High production and die life
3. Low installation and maintenance costs
4. Quiet operation and freedom from vibration

MAXIPRESSES have won acceptance as the *preferred* high speed forging presses for these reasons:

1. Rigidity of construction
2. Reliability in operation
3. National's leadership in engineering applications
4. National's dependable service performance

The new **MAXIPRES** brings to industry *23 distinctly new forging press features* . . . establishing new high standards of forging press performance! Among these new features are:

BRAKE: The old band-type brake has been replaced by a completely new water-cooled diaphragm disc brake. Provides extremely accurate stopping with negligible maintenance.

ECCENTRIC: Much greater in diameter and width. Bearing area and overall shaft strength now 30% greater.

CLUTCH: New trouble-free clutch with increased ruggedness and ability, fewer parts and indestructible driving keys.

TONNAGE INDICATOR: Takes guesswork out of estimating forging loads. Dial reads directly in tons, immediately indicating overload. Device prolongs life of press, reduces maintenance, speeds set up, rates jobs for the correct size MAXIPRES, and permits forging to closer tolerances.

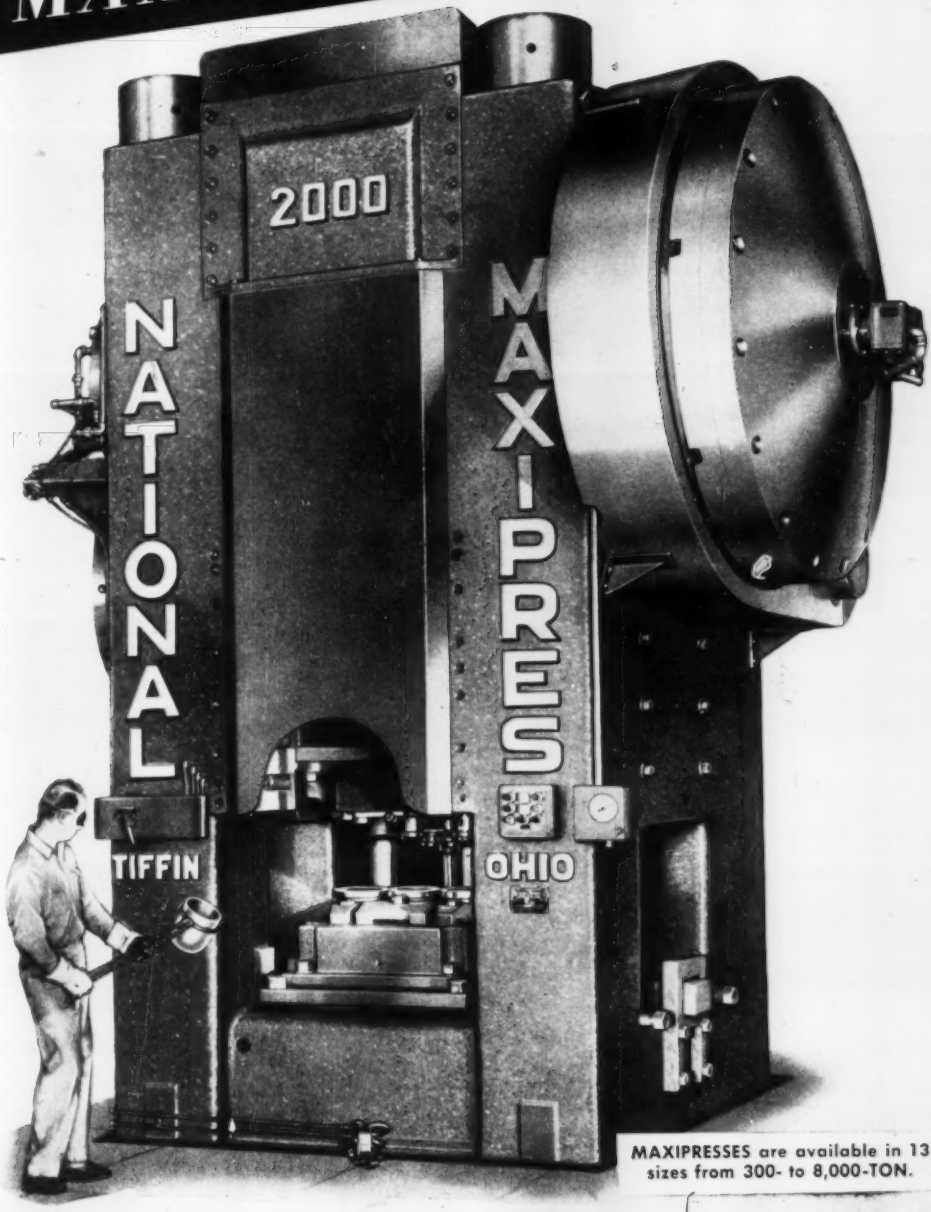
Additional particularly significant advancements have been engineered into the bedframe, pitman, wristpin, main bearings, counterbalance cylinders, air controls and wedge construction. The new MAXIPRES, designed for the times, fulfills the expanding requirements of the fast-moving forging industry.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO.

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES—MAXIPRESSES—COLD HEADERS—AND BOLT, NUT, RIVET, AND WIRE NAIL MACHINERY

Hartford Detroit Chicago

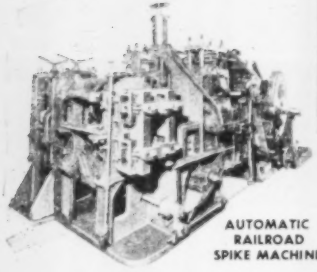
MAXIPRES!



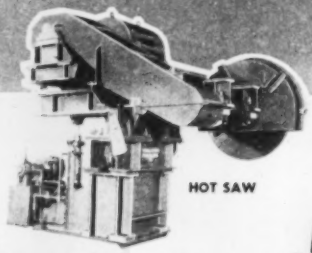
MAXIPRESSES are available in 13 sizes from 300- to 8,000-TON.

SERVING *TODAY'S* HEAVY DUTY PRODUCTION NEEDS

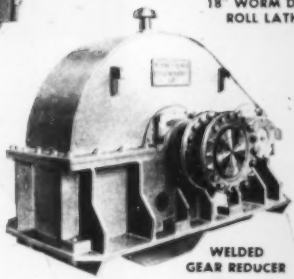
18" WORM DRIVE ROLL LATHE



AUTOMATIC RAILROAD SPIKE MACHINE



HOT SAW



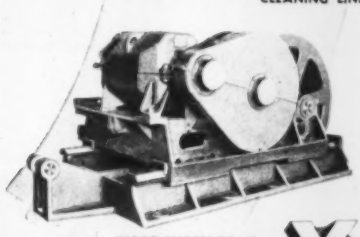
WELDED GEAR REDUCER

Check this List for the Products You Need

PARALLOY ROLLS (Pinch, Coiler, Tension, Steel Mill)
HYDRAULIC SLAB AND BILLET PILERS
STRIP AND SHEET OILING EQUIPMENT
SHEET SCRUBBER AND CLEANING LINES
HOT SAWS—ROCKING AND SLIDE TYPES
HOT BEDS—COOLING BEDS—TRANSFERS
BILLET EJECTORS—PINCH ROLL STANDS
SLITTERS—SPECIAL SHEARS AND GAUGES
TILTING TABLES—Traveling and Lifting Tables
Continuous PICKLING Lines—ROLLER LEVELERS
FURNACE Charging Equipment—Furnace Pushers
Strip Steel COILERS and REELS—SCRAP BALLERS
RAILROAD Spike Forming Machines—ROLL LATHES
Sheet GALVANIZING Lines—Wire Patenting Frames
Stretcher Levelers—Angle and Shape Straighteners
Rolling Mill Tables—Gear and Individual Motor Types
DUCTILE CASTINGS (80,000 PSI.)

Machinery Built to Customer's Design and Detail Drawings

SCRUBBER and CLEANING LINE



INGOT BUGGY DRIVE

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

SOLID STEEL HEADS, CAPS and MOUNTINGS MACHINED from SOLID BAR STOCK
HARD CHROME PLATED PISTON RODS
DIRT WIPER SEALS
NON-CORROSIVE BRASS BARRELS

AIR CYLINDERS

Meet J.I.C. PNEUMATIC STANDARDS . . .

(Write for FREE copy of these "Standards")

The four features illustrated above serve to show how Miller Air Cylinders *for years* have been meeting—*even exceeding*—the high quality set by the recently adopted J.I.C. Pneumatic Standards for Industrial Equipment. See for yourself! . . . write for our free bulletin A-105 and receive also your own *free* personal unabridged copy of these "Standards" with standard symbols, sample circuit, interesting point-by-point comparison—all neatly compiled into a handy booklet that fits your reference file and folds to fit your pocket.

COMPLETE MILLER CYLINDER LINE INCLUDES: AIR CYLINDERS, 1½" to 20" BORES, 200 PSI OPERATION. LOW PRESSURE HYDRAULIC CYLINDERS, 1½" TO 6" BORES FOR 500 PSI OPERATION, 8" TO 14" BORES FOR 250 PSI. HIGH PRESSURE HYDRAULIC CYLINDERS, 1½" TO 12" BORES, 2000-3000 PSI OPERATION. ALL MOUNTING STYLES AVAILABLE.

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MILLER MOTOR COMPANY

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AIR AND HYDRAULIC CYLINDERS · ACCUMULATORS · COUNTERBALANCE CYLINDERS · BOOSTERS · AIR HOISTS

CLEVELAND — PITTSBURGH — PHILADELPHIA — DETROIT — YOUNGSTOWN — BOSTON
HARTFORD — NEW YORK CITY — DAYTON — ST. PAUL — FORT WAYNE — INDIANAPOLIS
MILWAUKEE — NASHVILLE — SEATTLE — LOS ANGELES — SAN FRANCISCO — BALTIMORE
ST. LOUIS and OTHER AREAS.

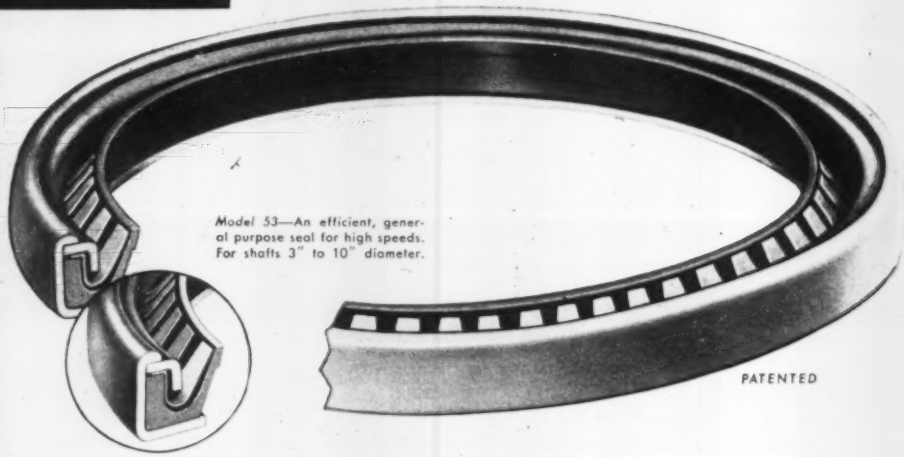
Miller TRADE NAME REGISTERED

Benefits to You

No Broken Castings
No Scratch-Damage to Piston Rods, Bushings and Seals
NO COSTLY "DOWNTIME"
NO REPAIRS
NO MAINTENANCE
NO POWER WASTAGE

Sales and Service from coast to coast

Prolong the life of your bearings



Model 53—An efficient, general purpose seal for high speeds. For shafts 3" to 10" diameter.

PATENTED

Use Garlock KLOZURE* Oil Seals

SERVICE records from thousands of different installations prove that bearings *last longer* and require *less maintenance* when they're protected by Garlock KLOZURE Oil Seals. Once a Garlock KLOZURE has been installed, you have the best possible insurance that the bearing lubricant will be sealed *in*—that dirt and foreign matter will be locked *out*.

There's a service-tested KLOZURE design for practically every bearing application. These superior oil seals are produced in a wide range of sizes including Metric O. D. to fit bearing manufacturers' standard bores. A few of the most widely used models are shown here.

Write today for the new Klozure Catalog

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK Klozure* OIL SEAL

*REG. U. S. PAT. OFF.

Model 51—A sturdy seal for medium* speeds. May be used on reciprocating rods and against moderate pressures.

Model 63—An efficient, general purpose seal for high speeds. For shafts 3" diameter and smaller.

Model 64—A strong, effective seal for heavy duty on shafts of the largest diameter.

Model 91A—A springless seal of small cross section, with the metal reinforcing member surrounded by rubber.

Model 91B—A springloaded seal of small cross section, with the metal reinforcing member surrounded by rubber.

WHEN YOU ORDER MATERIALS FROM

CENTRAL STEEL

AND WIRE COMPANY

You can be Sure...

That You Can Have It *at Published Prices* If We Have It

In spite of sweeping restrictions, and acute shortages on many items, Central Steel & Wire Company will continue to maintain its established policy of selling all available materials at published prices.

Under this policy, customers always know the price they are to pay for a definite quality that can be certified.

We would welcome an opportunity to discuss your current and future material requirements.

Hot Rolled • Cold Finished
Carbon & Alloy • Stainless
Copper • Brass • Aluminum
Expanded Metal •
Structurals

Central Steel & Wire Company

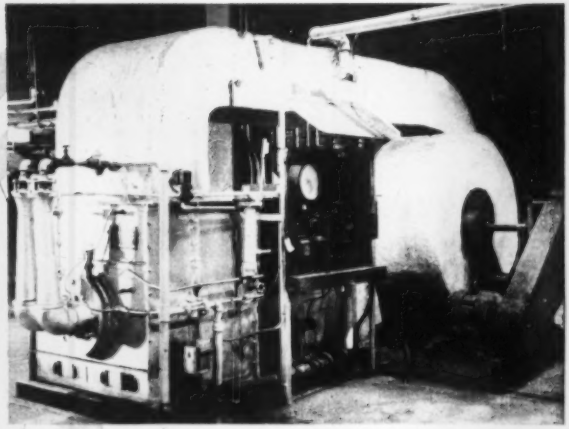
CHICAGO 80, ILL.	DETROIT 12, MICH.	CINCINNATI 14, OHIO	MILWAUKEE 14, WIS.
P. O. Box 5310-A	13400 Mt. Elliott Ave.	Box 148 Annex Sta.	6623 W. Mitchell St.
REpublic 7-3000	TWinbrook 2-3200	AVon 2230	EVergreen 4-7400

GAS-FIRED INGOT MOLD DRYING EQUIPMENT

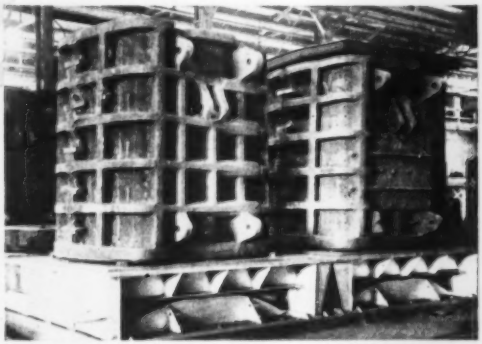
Designed by

The Carl Mayer Corporation

UPS PRODUCTION, CUTS INITIAL COSTS



One of a battery of 4,000,000 Btu Gas-fired recirculating air heaters, showing burners, controls and safety devices, heat delivery fan and return ducts.



Ingot molds in place on Heating Bench, ready for drying.

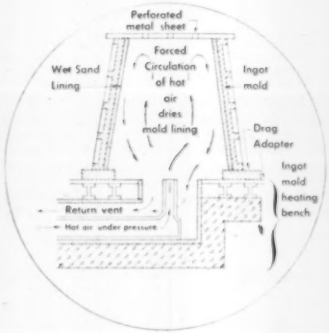
WANT TO UP YOUR INGOT MOLD-DRYING PRODUCTION as much as 100%? One user reports doing this with equipment made by The Carl Mayer Corporation of Cleveland, Ohio. This patented system eliminates costly oven casing by letting the mold be its own oven.

The molds, open at both ends, lined with green sand, are placed on a special Ingot Mold Heating Bench. The GAS-fired heater system forces hot air through nozzles under the molds. A perforated metal plate placed on top of the mold holds in most of the Gas-heated air which bakes the lining and returns thru ducts to the heating and pump unit. Placing and removing the molds are readily done by overhead cranes.

This successful application of GAS to solve a steel mill production problem is one more example of how GAS can work for you. Among the factors making GAS such an important industrial fuel are:

- ★ **Ease of precise temperature control**
- ★ **Economical to use**
- ★ **Ready adaptability to your specialized needs.**

Your Gas Company Representative knows how to put GAS to work for you, boosting production, cutting costs. Call him today.



Schematic diagram shows how mold lining is cured, with mold acting as its own "oven", eliminating need for oven casing.

AMERICAN GAS ASSOCIATION

420 Lexington Avenue, New York 17, New York

MORE AND MORE... THE TREND IS TO GAS FOR ALL INDUSTRIAL HEATING

A MESSAGE TO AMERICAN INDUSTRY

"This is more than a shortage . . . this is an emergency.

Every pound of your scrap is needed, NOW!"

"THE STEEL INDUSTRY is currently operating at more than 100% of rated capacity—turning out well over 2 million tons of steel per week. This record high production—every ton of which is in urgent demand—cannot be kept up unless we get more scrap from every potential source. For without your scrap we cannot produce enough steel. Today, every ton of steel turned out requires a half a ton of scrap for its production. That's why scrap—more scrap—is so urgently needed, and needed right away.

"The fact we have to face today is that steel mills are operating on a hand-to-mouth basis as far as scrap is concerned. Some mills are working on only a two-day supply of scrap. We already have had to shut down steel-making furnaces for lack of scrap.

"That's why we are asking you to strain every effort to get more scrap out of your plants and yards and on its way to the mills . . . to search out the scrap that doesn't come to market in normal times. You'll find this "dormant" scrap in obsolete equipment, tools and machinery that you haven't used for years . . . overlooked in your storage sheds . . . or rusting away in a junk pile in some forgotten corner. It's there. Turn it in at once—*so we can turn out the steel you need.* We can't do it without your help."

President, United States Steel Corporation

USS

1-1182

UNITED STATES STEEL

ALLOY STEEL FORGINGS
FOR THE AIRCRAFT INDUSTRY

From its early days National Forge has produced alloy forgings, heat treated and machined to the exacting requirements of the Aircraft Industry.

We are proud that our facilities—the special electric steels, heat treating and skilled machining—have made it possible for us to assist the aircraft industry in pioneering the development of many mechanical components.

Pictured here are shafts for turbo-jet engines and rotor shafts for helicopters; both requiring the maximum in strength and resistance to fatigue, wear and shock. Their production, here at National Forge, started with the steel itself, and through successive steps of heat treatment and machining were brought through our plant under the closest metallurgical and physical control.

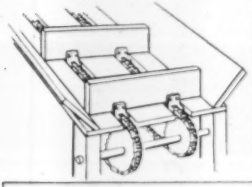
National Forge has complete facilities and assumes the whole responsibility of producing your forgings from the steel through finish machining. This service is yours for aircraft or for commercial forgings.

NATIONAL FORGE AND ORDNANCE COMPANY

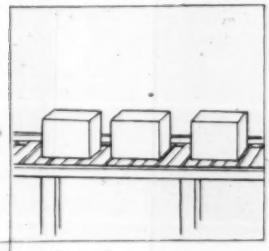
IRVINE, WARREN COUNTY, PENNSYLVANIA

it needs a "Handle"!

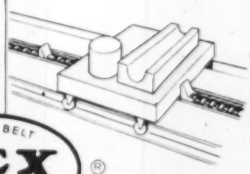
A Drag Conveyor



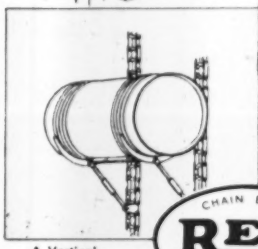
A Slat Conveyor



A Pusher Conveyor



A Vertical Conveyor



CHAIN BELT REX COMPANY

BALDWIN-REX

Instead of costly, manual "push-pull-carry" methods, a modern materials handling system, such as an economical chain conveyor, is the answer to the problem of high non-productive costs.

The complete Chain Belt Company line of conveyor chains and attachments can materially cut the non-productive costs incurred in transporting raw and finished materials to and from initial storage . . . through manufacturing and on to finished stores or shipping. They permit control of production and delivery schedules because they assure a regular flow of materials along assembly lines. They shorten production time per unit and eliminate the costly waiting time which usually results from irregular material flow.

Chain conveyors also assure most effective use of floor space. They usually eliminate the need for wide aisles and the necessity for extensive storage space around machines or processing stations. Chain conveyors increase safety by reducing congestion in aisles . . . by doing the heavy lifting and hauling mechanically. They are lower in maintenance costs as compared to other types of handling equipment . . . reduce cost of direct repairs and maintenance . . . eliminate need for storage quarters.

You'll find it worthwhile to investigate the complete Chain Belt line of chain conveyors and attachments for your operations. The informative booklet "Build Profits by Cutting Handling Costs" will give you the story. Send for your copy. Chain Belt Company, 1660 West Bruce Street, Milwaukee 4, Wis.

Chain Belt COMPANY

OF MILWAUKEE

Rex Chain & Transmission Division
Milwaukee 4, Wis.

Baldwin-Duckworth Division
Springfield 2, Mass.

Note the clean, straight lines of the moldings formed on the shelf by this Cincinnati Press Brake.

accurate forming on a Cincinnati solved this problem

These outstanding sectional Bulman display shelves fit accurately.
Photo courtesy E. O. Bulman Mfg. Co., Inc., Grand Rapids 2, Michigan.

Accurate forming paid off in three ways for Bulman Company, manufacturers of steel display shelves.

Trouble had been experienced in maintaining regularity of product. Now the clean, straight line formed from end to end of the shelving permits a perfect match-up of sections, eliminating a costly trim piece.

Better product, with no discards, and one piece completely eliminated, were the results when this Cincinnati Press Brake was installed . . . it was a profitable investment.

Write for Catalog B-2A—a Cincinnati Press Brake may improve your product and reduce your costs.

THE CINCINNATI SHAPER CO.
CINCINNATI 25, OHIO U.S.A.
SHAPERS · SHEARS · BRAKES

CINCINNATI

The Metalworking Outlook

August 6, 1951

Early Birds in Steel Ordering

Some steel mills are requesting that their customers get on the first quarter, 1952, books with the tonnages they'll require under CMP. One possible reason for the action: Get the bread-and-butter customers on the books to avoid the rat race—both for the mill and the buyer—that is going on now for September tonnage. Actually, no steel mill is authorized to make such a demand nor can a customer, under CMP rules, place those orders yet because no CMP tickets or precertification percentages for the first quarter of 1952 have thus far been issued. Precertification percentages permit a user to place a fixed proportion of his order far in advance to allow better scheduling flexibility in the mill.

Relations Strained

Relations are strained between Defense Production Administrator Manly Fleischmann and the Iron & Steel Products Industry Advisory Committee. The over-issuance of CMP steel tickets for September hasn't helped any, and the committee believes that Mr. Fleischmann at some of their meetings in the past has been evasive.

Fracas in NPA

An intramural battle is going on in NPA. The Iron & Steel Division of that agency, badgered from all sides by claimant units of the government for steel, wants relief from the pressure. It's annoyed because some of its allotments to agencies have been increased by higher-ups. The division wants its status and powers clarified. DPA Boss Fleischmann says he'll come up with that clarification.

Controls Bill: Little Help

The new controls bill, reluctantly signed last week by Mr. Truman, will help industry a little, but not much. It will ease pricing controls slightly. It reduces down payment requirements on some consumer durables, but production of those items can be limited just as severely under the new law as the old.

OPS Gets Under the Wire

"Dirty pool." That's the charge many industry men made last week when OPS rushed through a flock of new pricing orders by midnight, July 31. If orders were issued by the deadline, they came under the old Defense Production Act and could roll back prices much more easily than orders issued Aug. 1 or after under the new one. A major metalworking pricing order that was issued under the old law was CPR 60, on metal castings (p. 49).

Needed: Tax Aid for New Firms

Watch for some legislative tax relief for companies formed since Jan. 1, 1946. Newly organized is the Young American Business Conference by 60 small new corporations. National chairman is J. S. Finger, president of Corrulux Corp., Houston. According to him,

Production Engineering News—p. 71 The Market Outlook—p. 153

small new firms formed since 1946 have no relief under the law to permit them to achieve their normal growth, but are subject to the maximum tax rate of 62 per cent, although growth companies formed before 1946 have such relief. The conference wants a subcommittee created by the Senate Finance Committee to study the problem, or a full hearing before the Senate Small Business Committee.

Slow but Sure

Wheels are moving slowly, but fairly surely, toward final action by Congress to legalize freight absorption once and for all. FTC tacitly admits that absorption is legal, at least in the case of steel, but the whole question is still ambiguous. The Senate Small Business Committee is studying S. 719 that would clarify the issue. The consensus of witnesses at hearings on the measure is that by enacting into law the provision that freight absorption is legal, businessmen will no longer have the fear that the Supreme Court or the FTC will reverse the decision.

Technology in Russia

We may not be as far ahead of the Communists technologically as we think. That's the opinion of Dr. Boris A. Bakhmeteff, Russian ambassador to the U. S. during the Kerensky days and now a business man in the U.S. Many Russian D.P.'s who fled the Soviets during the war are now working as mechanics for Lion Match Co., of which Dr. Bakhmeteff is president. "They are excellent mechanics, as good as our own," he says. While the Soviets in technology may still lag behind the U.S., they probably are ahead of most other countries of the world, he thinks.

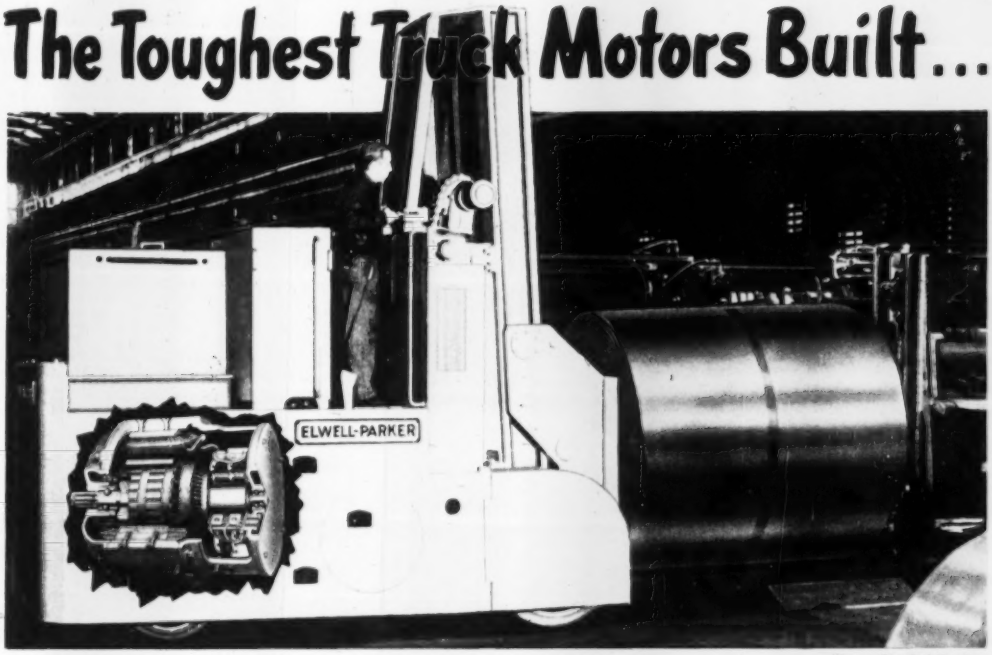
Straws in the Wind

More and more closely held, smaller companies are selling out to the bigger firms because the seller wants to realize the profits now rather than later when taxes will probably be higher . . . Rochester Products Division of General Motors Corp. laid off 700 production workers temporarily because of materials shortages . . . Don't disband your expensively trained sales organization just because you can get orders by scarcely lifting a finger, advises Charles W. Bishop of Ghrysler Corp.; he advises a study to see how salesmen can be used in other jobs.

What Industry Is Doing

NPA says it can do nothing for out-of-luck CMP ticket holders for September steel, but it believes many problems will solve themselves naturally by the fourth quarter (p. 43) . . . Investment trust funds are beginning to flow more readily into smaller, growing companies and as venture capital for new processes and ideas (p. 45) . . . Bethlehem Pacific Coast Steel Corp. has a $47.5 million shipbuilding contract (p. 46) . . . Automotive battery sales are off (p. 47) . . . Don't overlook the Army Quartermaster Corps as a potentially large buyer of metalworking products (p. 54).

The Toughest Truck Motors Built...



Twenty Ton Coil Handler

...for the toughest materials handling jobs

Why are Elwell-Parker trucks usually assigned the hardest jobs where mixed fleets are used? Why do Elwell-Parkers commonly give 20 to 30 years of steady service? A major reason is their stout "hearts" —E-P built, electric motors. Their costly glass and asbestos insulation makes them practically indestructible and fireproof. They are built to handle 500% overload. Their *arc welded* armature coil leads never melt or vibrate loose in service. Having *more* copper, greater commutator area, and *twice* the usual number of brushes, E-P motors convert *all* the power delivered to them.

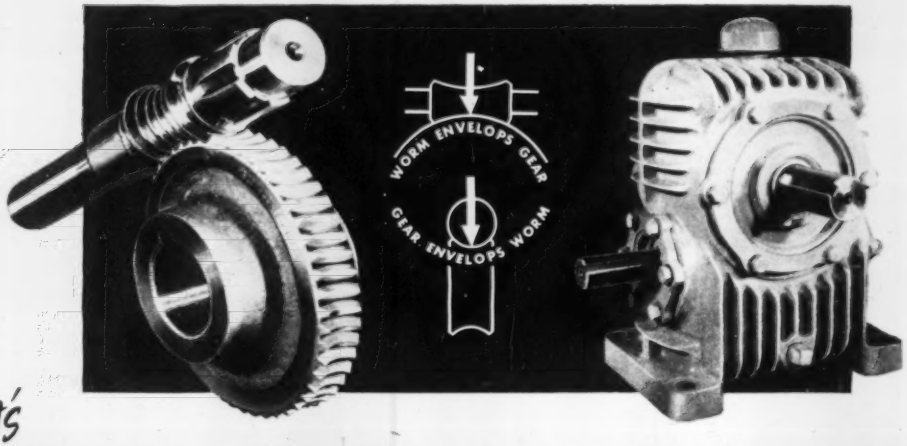
Yes, Elwell-Parkers have the toughest electric* truck motors ever built—one reason why Elwell-Parkers offer you *more per truck-dollar invested!* The Elwell-Parker Electric Company, 4101 St. Clair Avenue, Cleveland 3, Ohio.

**We also build gas trucks, but for most jobs electric power is more economical.*

E-P
INDUSTRIAL TRUCK MOTORS

ALL THE FACTS **on the design and construction of remarkable E-P Electric Motors are available in an illustrated bulletin. Send for your FREE COPY NOW!**

ELWELL-PARKER
POWER INDUSTRIAL TRUCKS
Established 1893



That's right—"hydraulically smooth" gears!

What we mean by "hydraulically smooth"

It used to be thought that carbide-tipped milling cutters on milling machines had to be protected against carbide-damaging gear vibrations in the cutter drive by using large flywheels at the cutter head. When Cone-Drive double-enveloping gears were tried, their "hydraulic smoothness" made the flywheels unnecessary.

Never heard of gears that are hydraulically smooth? Then you should try Cone-Drive DOUBLE-ENVELOPING gearing: In Cone-Drive gears, the pinion or worm is wrapped around the gear and the gear is wrapped around the worm in such a manner that

regardless of number of teeth, gear size or ratio, ⅛ of all gear teeth are in CONTINUOUS CONTACT.

What is more, they are in continuous FULL DEPTH area contact. As a result, not only is power transmitted in a smooth uninterrupted flow AROUND THE CIRCUMFERENCE of the enveloped gear, but the load capacity for a gear set of any given center distance is greatly increased.

That means longer, trouble-free service, and the ability to use smaller gears to transmit a given load. As a matter of fact, Cone-Drive double-enveloping gears are so compact that many designers find they can simply

replace costly built-in gear trains with complete standardized Cone-Drive speed reducers

If you are looking for gears or reducers that will give you real hydraulic smoothness, greater load carrying capacity in a limited space, and a simpler gearing installation, fill in the coupon, attach to your company letterhead and mail it today.

CONE-DRIVE GEARS
DIVISION OF MICHIGAN TOOL CO.
7171 E. McNichols Rd.
Detroit 12, Mich.

Please send me without obligation further information on double-enveloping Cone-Drive Gears. We are particularly interested in the following:

Horsepower_____to_____

Ratio ____/1 to ____/1

Name_____

Title_____

(attach to company letterhead and mail)

CONE-DRIVE GEARS
Division Michigan Tool Company
DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS
7171 E. McNichols Road • Detroit 12, Michigan

Why CMP Flounders

Most reasonable buyers and sellers of steel, copper and aluminum expected that a certain amount of confusion would attend the shift by National Production Authority from rated Defense Orders to the Controlled Materials Plan, but they were not prepared for the mess that has developed in allocations for September. Hundreds of purchasers who had CMP tickets—supposed to be as good as cashier's checks—will not receive their allotments.

NPA officials say this situation is due to three things: (1) Natural confusion in the shift to CMP, (2) an unexpected high carryover of DO tonnage which received CMP authorization and (3) emergency allotments for the Kansas-Missouri floods. NPA spokesmen declared that the situation, while admittedly bad, is not as chaotic as that attending the shift to CMP during World War II. They believe many of the difficulties will be overcome during the fourth quarter.

Many informed persons in and out of government do not share this hopeful view. Unofficially, some NPA people have their fingers crossed. Eugene G. Grace, chairman of Bethlehem Steel, is critical of distribution of steel under CMP and believes it should come in for searching review. Irving S. Olds, chairman of U. S. Steel, says that the manner in which CMP is shaping up borders on the ridiculous and that "the steel industry could do a better job."

These attitudes are typical of widespread criticism among sellers and buyers alike. However, it should be emphasized that this criticism is not directed as much against the persons who are trying hard to make CMP work as it is directed against the basic idea of controls and the circumstances under which they are administered. There can be honest doubt as to whether anything as complicated and cumbersome as CMP is really necessary. Secondly, one can raise the pertinent question as to whether any plan of allocation, carried on under the handicaps of entrenched Washington bureaucracy, ever can be satisfactory.

If we must have controlled allocation, a few good industry men—working anywhere except Washington and insulated from the curse of government muddleheadedness—can do a better job at a fraction of the cost.

E. C. Shaner

EDITOR-IN-CHIEF

INJUSTICE OF JUSTICE: Every now and then news comes from Washington to the effect that a representative of industry has left his government job because the Justice Department has discovered a technicality upon which he could be disqualified. To be fair, one must concede to the department certain rights in connection with the screening of individuals who

serve the government on a temporary basis. However, experience to date shows clearly that Justice is influenced unduly by ancient prejudices against business.

For instance, it looks askance at anybody who is associated with a trade association. Why? Because over the years, occasionally an association has run foul of anti-trust laws. The department's bigoted prejudice is depriving government agencies of scores of association staff officials who possess an amazing wealth of valuable information about the industries they serve.—p. 50

STEEL IMPORTS SOAR: Imports of European steel into the United States have multiplied about 10 times in 10 months. Last October shipments from abroad were running at an annual rate of 250,000 tons. Today the flow is at a yearly rate of 2.5 million tons. National Production Authority says that one out of every five steel rods fed into independent United States wire mills in the first quarter of 1951 came from Europe. It also says one out of every eight tons of plates going into shops of domestic small independent fabricators in the first quarter was supplied by European steelmakers.

NPA has encouraged steel imports by allowing American fabricators to use the imported steel to augment domestic allotments, without figuring it in their quotas. Before that policy was adopted, users were required to figure imports in their quotas. —p. 53

QMC IS STEADY BUYER: Whenever this nation mobilizes for war or defense, so much purchasing for the armed services clears through Ordnance, Signal Corps, Engineers, Bureau of Ships, Air Force and other heavy procurement agencies that many potential suppliers are likely to overlook or underrate another important procurement agency. This not-too-often-publicized buyer is the Army Quartermaster Corps.

QMC is a steady purchaser of many items which either are regular products of metalworking plants or could be manufactured easily by them. A random list of such articles would include all types of materials handling equipment, stoves and ranges, cooking utensils, 5-gallon ("blitz") cans and scores of other types of containers, and numerous special mobile units such as bakeries, laundries, shower baths, clothing and shoe repair shops, and gasoline drum cleaning and reconditioning shops.

For hundreds of metalworking plants, the shift from peacetime production to QMC work would be simpler than conversion to ordnance, aircraft or navy work. —p. 54

WHITE BRASS PLATING: Motordom is agog over a "white brass" underplate to take the place of conventional but restricted copper and nickel. It involves a cyanide type of plating solution, with certain brighteners and addition agents, plus anodes of approximately 80 per cent zinc and 20 per cent copper. It can be applied to any metal with standard equipment and with a plating cycle slightly slower than bright zinc. Maximum thickness is 0.0003-0.0004-inch. Plating is followed by a chrome flash. Samples have withstood the salt spray test up to 48 hours, whereas specifications covering the old copper-nickel-chrome combination provide for only 16 hours.

"White brass" plating is not yet a sure fire hit. Control of the system is critical. Some difficulties have yet to be overcome. However, enough enthusiasm is being manifested over its possibilities to justify careful consideration of the process by all who plate or use plating. —p. 57

NEED NEW MACHINES: Drastic changes in aircraft engines are creating machining problems that cannot be handled satisfactorily on orthodox machine tools. The new axial-flow gas-turbine engines call for production techniques unlike those encountered in building reciprocal engines or centrifugal-type turbojets. Among the new problems is that of machining a wide range of components of large diameter and thin wall section.

Typical of the new type of work are thin-walled stainless steel rings for turbojet nozzle vane rings, blade shrouds and tailpipes. The diameters run up to 48 inches and the machining cuts are light and precise. These call for a machine having the range of a large car-wheel lathe and the sensitivity of a toolroom lathe. Pratt & Whitney Aircraft took this problem to Lodge & Shipley, which has designed and built several T-bed lathes to the new specifications. Other machine tool builders are designing models for new aircraft engine work. Soon we will have a complete new line of machine tools.

—p. 76

Better Bearings for Less Money

Quick Shipment from Ryerson

Here's an outstanding Babbitt metal that combines low cost with high strength and long wear. It's Glyco Babbitt, made from the purest virgin raw materials by an exclusive process.

Because Glyco is a lead base alloy it costs less and there are no restrictions on its use for bearings. Yet our exclusive manufacturing process gives Glyco physical properties equal to those of much more expensive and restricted high-tin Babbitts. Glyco is unusually slow to wear and slow to heat because it is a remarkably homogeneous alloy. Virtually free from dross when melted, it pours freely and can be remelted again and again without loss in quality.

Five types of Glyco are readily available from Ryerson. They cover all bearing applications—light or heavy shock loads, low or high shaft speeds. Next time you're ordering from your nearby Ryerson plant, remember that we have large stocks of Babbitt ready for quick shipment.

RYERTEX BEARINGS FROM RYERSON

Ryerson also makes a non-metallic bearing—Ryertex—for a wide variety of industrial applications. Possessing an extremely low coefficient of friction with only water lubrication, Ryertex also performs well with oil or grease. Ryertex easily withstands strains up to 36,000 lbs. psi.; gives remarkably long service. Ask your Ryerson representative for full information.

RYERSON-GLYCO

JOSEPH T. RYERSON & SON, INC.—STEEL SERVICE PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

Inland's interest in your steel problems does not stop at our shipping dock.
Your scrap is needed by the steel industry for national defense.

"Let's try changing the blanking direction", said Cliff

Recently, a large automobile manufacturer was concerned with results of a difficult deep drawing operation . . . the fabrication of steel oil pans. These pans were made from Inland's fully aluminum killed cold rolled steel sheets. For six months, these sheets had been ordered to a thickness of .048" and cut to length 35¼" x 43"—and breakage had run to 3.92% of approximately 36,000 oil pans manufactured.

When Cliff Baker*, one of Inland's mill representatives, was given the problem, he suggested changing the blanking direction—inserting sheets in the stamping machine at right angle to the previous direction.

This meant a simple change in the ordering procedure. The customer changed his dimensional specification for these sheets to 43" x 71" so that the direction of rolling and the subsequent direction of steel grain would conform to this suggested practice.

Result: In the following six months, breakage was reduced to 0.75% of 30,000 oil pans fabricated. The number of oil pans scrapped was cut from over 1,400 to approximately 230 in these two six-month periods! INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

*Not actual name

No Help for September Steel

NPA says it can do nothing for out-of-luck CMP ticket holders for that month. It believes many problems will solve themselves naturally by the fourth quarter

IF YOU are one of the unfortunates who could not get a CMP steel check cashed for September, you'll have to makeshift as best you can for material in that month. NPA says it's too late for it to do anything for September.

The agency admits that hundreds of companies have not been able to get their allocations but it insists that "the problem is not as bad as first thought." It points out that thousands of companies did get their steel and have no complaint. STEEL's spot checks reveal that some buyers of copper and aluminum are also having trouble getting their September CMP checks honored, but that, on the whole, the transition to CMP for the two nonferrous metals has gone more smoothly than for steel.

The Reasons Why The over-issuance of CMP tickets in September was caused primarily by the natural confusion in the shift to CMP and by unexpected high carryovers of DO tonnages which got CMP authorization. A third, minor cause was the added allotments for the Kansas-Missouri floods. NPA claims that the difficulties attending the transition to CMP during World War II were even worse than they are now.

CMP GIVES A ROUGH RIDE
. . . steadier by fourth quarter?

The official NPA stand is that many of the problems in steel will work themselves out naturally by the fourth quarter. The transition wrinkles will smooth out. The DO carryovers from previous months will be pretty well wiped out by October. Steel for the Kansas-Missouri flood areas will have been rolled and shipped. Unofficially, some NPA people are not so optimistic and have their fingers crossed.

On a Note of Caution The agency is being far more cautious about its fourth quarter program allotments than it was about the third quarter schedule. The October-November-December steel, copper and aluminum allotments are only about 10 per cent above expected production. They were 15 per cent above in the third quarter. The standard practice is to overallot because during World War II the allocators found that the claimant agencies, particularly the military, did not take 100 per cent of their quotas. As another safety valve, NPA is setting aside 5 per cent of the expected output as a reserve in case things again go wrong. No such provision was made in September.

In announcing the fourth quarter

Where Allocated Fourth Quarter Materials Will Go

CLAIMANT AGENCY, PROGRAM	STEEL (TONS)	COPPER (000 LBS)	ALUMINUM (000 LBS)
Estimated Supply	21,336,000	1,166,000	598,000
Secretary of Defense	1,946,000	205,800	168,000
Secretary of Army	32,634	1,260	300
Atomic Energy Comm.	183,403	7,160	7,559
Federal Security Agency	165,913	5,071	*515
General Services Admin.	19,920	600	225
Veterans Admin.	11,041	501	400
Housing & Home Fin. Agency	180,000	17,457	500
Secretary of Agri.	127,400	8,490	2,200
Secretary of Interior	10,000	256	37
DSFA, Coal Mining	25,615	215	31
DSFA, Coke Ovens	18,135	535	70
Defense Elec. Power Admin.	289,176	80,852	35,500
Defense Minerals Admin.	41,395	1,435	140
Petr. Admin. for Defense	1,806,500	7,975	785
Defense Transport Admin.	83,000	1,700	300
Maritime Admin.	103,000	4,455	350
Bureau of Public Roads	250,050	1,150	520
Civil Aeronautics Admin.	6,190	741	20
NPA Industry Divisions			
Agriculture Mach., Imp.	528,400	8,500	5,800
Aircraft	15,639	1,148	7,950
Aluminum & Magnesium	12,850		3,800
Building Materials	1,016,100	45,900	50,000
Chemicals		1,000	8,135
Communications Equip.	39,453	53,090	2,900
Construction Mach.	503,450	4,340	2,000
Consumer Dur. Goods	867,000	49,050	57,000
Containers, Packaging	1,615,216	271	17,900

CLAIMANT AGENCY, PROGRAM	STEEL (TONS)	COPPER (000 LBS)	ALUMINUM (000 LBS)
Copper	43,140	2,525	11,000
Electrical Equip.	571,530	148,700	27,000
Electronics	72,550	33,385	15,750
Engine and Turbine	461,600	15,070	2,600
Industrial, Comm. Construction	653,725	7,100	22
General Components	1,067,500	150,094	14,700
General Industrial Equip.	866,500	61,020	25,400
Iron and Steel	347,100	1,650	29,000
Leather and Leather Prods.	14,000	425	700
Lumber and Lumber Prods.	10,236	100	1,200
Metal Working Mach. Equip.	643,500	25,080	7,600
Mining Machinery & Equip.	95,000	2,595	225
Misc. Metals & Minerals	1,809	837	16
Motion Picture-Photo Prods.	8,320	1,420	3,750
Motor Vehicle	3,464,300	147,800	92,300
Ordnance, Shipbuilding	167,212	8,015	1,300
Printing, Publishing	3,788	1,702	375
Pulp, Paper, Paper Board	1,000	5	50
Railroad Equip.	1,872,425	64,355	8,500
Rubber	33,715	3,342	475
Scientific, Tech. Equip.	47,500	35,600	16,000
Service Equip.	46,850	2,800	5,750
Tin, Lead and Zinc		10	5,000
Water Resources	164,950	4,050	175
Exports (ECA-OIT)	676,000	9,825	2,450
Canada	343,625	2,750	2,250
MRO Supplies	1,312,150	26,884	3,050
Reserves for Program Adjustment and Self-Certification	1,171,015	59,850	31,900
Total Allotments	24,058,520	1,325,941	681,475

allotments, Defense Production Administrator Manly Fleischmann says that military programs will take an average of 20 per cent of the metals in the fourth quarter. For that period, NPA had requests for carbon steel that would have taken 147 per cent of the available supply. Nearly two and a quarter times as much structural steel was requested as would be produced. The metal allotments for civilian consumer goods will mean a lower production in the fourth quarter than in the third. Fourth quarter steel quotas for automobiles will make possible assemblies of 1.1 million, about 60 per cent of production in the first half of 1950.

Steel Heads Hit CMP

Olds of U. S. Steel and Grace of Bethlehem attack the way steel distribution is handled

CHAIRMEN of America's two largest steel companies criticized management of CMP last week.

Irving S. Olds, U. S. Steel Corp., said, "the steel industry could do a better job." Eugene G. Grace, Bethlehem Steel Corp., said the manner in which the program is shaping up borders on the ridiculous.

Bear by the Tail—Mr. Olds points out that the government has started the job, so will have to finish it "whether we like it or not." He sees no balance between steel supply and the demand in the immediate future. Currently, and for some time ahead, it appears that all the steel U. S. Steel can make will be required, despite the lag in demand for some consumer hard goods.

Mr. Grace believes that distribution of steel under CMP should come in for searching review. As conditions now stand, CMP certificates amount to no more than hunting licenses. He estimates direct military requirements at 10 per cent of total steel demand in the third quarter and says that under these circumstances full control of steel production and distribution as contemplated by Washington is unnecessary. He regards the remaining 90 per cent of demand, which includes defense - support programs, as being just so much civilian demand that the steel industry could very well handle itself, and far more effectively than the government.

Eyes Bigger than Stomach—Bethlehem, in attempting to appraise some of the current demand, analyzed the requests of the company's regular customers as they related to one month of Bethlehem's steel production. Most consumers had asked for at least twice what they normally require.

Mr. Grace also criticized the CMP policy that permits buyers who use up to 100 tons of steel per quarter to get it from the mills if they want to. Thousands of these small consumers are approaching the mills, although the warehouse would be their normal supplier. Many who have the tickets for 100 tons or less, Mr. Grace believes, couldn't use it all if they tried. He sees in this the makings of a fine black market.

Inland Explains to Customers

In a letter to its customers about CMP, Inland Steel Co. says "we hope that needless controls will soon be relinquished so we can enjoy our normal relationships with our friends." Inland explains rules and regulations of CMP force it to operate on a first-come-first-serve basis with CMP ticket holders, so that some established customers must be turned down.

DiSalle Defends GOR 15

He says it's a price, not a profit control and that it should offer incentives

ATTACK by Frederick S. Blackall, vice president of the National Machine Tool Builders' Association, on the government's machine tool ceiling price regulation brought a quick response from the nation's price director, Michael V. DiSalle.

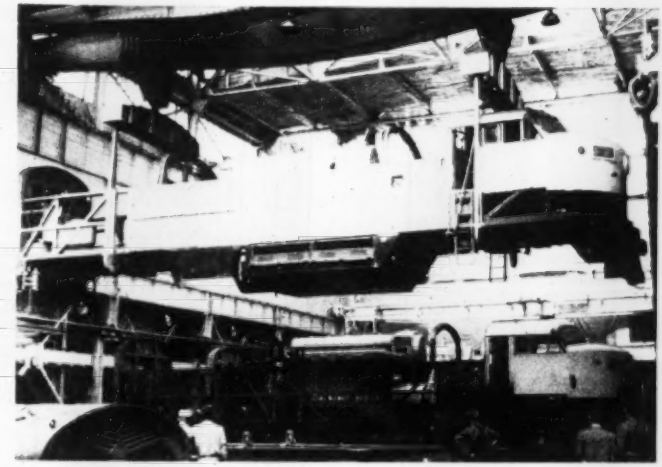
The regulation (General Overriding Regulation 15) is a profit control, not a price control, Mr. Blackall avers (see STEEL, July 30, p. 46). It's not a profit control, says Mr. DiSalle. Instead, it assures at least a minimum profit for machine tool builders, he declares in a letter to Sen. Burnet R. Maybank.

Modifier—GOR 15 modified price controls for machine tool manufacturers to stimulate production and offset expansion risks, Mr. DiSalle asserts. It assures all machine tool makers of realizing profits at least to the point of excess profits tax payment requirements, he declares. GOR 15 is optional, he emphasizes, and adds that some industry representatives told the Office of Price Stabilization they would not use it because their ceilings were already higher than its provisions would allow.

Mr. DiSalle explains further that GOR 15 gives manufacturers a substantial incentive for accepting government tool orders by assuring a profit return on all business assets after interest charges.

No Profit Control—The regulation does not control profits, Mr. DiSalle maintains, but rather establishes a minimum profit position during the transitional expansion period. With regard to refund provisions, he says the regulation permits manufacturers to estimate costs and simply requires refunds when estimates for a year's operation exceed actual experience by more than five per cent.

SAVING STEEL: Almost all porcelain enamel products and parts—range tops, bathtubs, sinks, washing machine tubs and shells—were in the 100 carloads of defective parts that overflow the warehouses into the yards of the New Process D-Enameling Corp.'s new Aurora, Ill., plant. The company began stripping defective porcelain enamel coatings from steel on a production basis in a pilot plant in April, 1949. The 100 carloads of products represent about 1200 tons of steel; retail sales value of the products would be about $250,000



"WHEELING": The Fairbanks-Morse 3200-horsepower two-unit freight locomotive is the leader of a line of diesel-electric road locomotives manufactured at the Canadian Locomotive Co., Kingston, Ont. Power plant ratings of 1600, 2000 and 2400-horsepower can be installed in one basic structure with no change in the general arrangement of the basic unit. That gives the name "Consolidation-Line" or "C-Line" to the diesels. Here a 150-ton Morgan crane hoists a partially assembled C-Line locomotive in the "wheeling" operation

Investment Trend May Aid Little Fellow

The booming investment trust business has a new offshoot —organizations that have money to invest in smaller, growing companies and in new processes and ideas

A DEVELOPMENT within a development holds promise of giving new financial support for smaller growing companies and those with new technical processes that need more venture capital.

The big development is the growth in the investment trust industry, which invests the money of its many shareholders in a widely diversified group of securities.

Offshoot—The development within that development is the beginning of a trend toward the formation of investment companies that specialize in investing in smaller, growing firms or in companies with new technical processes or ideas that need more venture capital. Two types of organizations have developed in this latest offshoot of the expanding investment trust business. One is the open-end investment trust—the number of its shares of stock may grow and grow —that actually invests in growing companies exclusively. The other is the closed-end organization—similar to any manufacturing firm in that the number of its shares of stock is limited. That firm is partly financed by investment trusts to risk capital in new processes. An example of the first type of organization is Growth Companies Inc.; an example of the latter: American Research & Development Corp.

Growth Companies Inc., Philadelphia, celebrated its first year of business Aug. 1. When founded, it had an assets value of $256,500. Today, just one year later, those assets have more than tripled, to over $900,000. When the company gets bigger, it will devote even more of its resources than it does now to provide venture capital for the smaller firm. Blue sky laws—state securities regulatory legislation—impose restrictions on how much stock Growth Companies can own in any one company, but its investment diversification enables it to spread its resources around and thus own shares in some smaller firms that the private investor ordinarily cannot afford to touch.

On the Basis of Research—Growth Companies makes its investing decisions partly on the basis of the research programs of the firms in which it is interested. To assist in the evaluation of such programs are board members of Growth Companies who include Clyde E. Williams, director of Battelle Memorial Institute; Zay Jeffries, retired vice president of General Electric Co. and past president of the American Society for Metals; Roger Adams, head of the University of Illinois' chemistry department; and Bayard D. Kunkle, retired vice president of General Motors Corp.

American Research & Development Corp., Boston, the other type of company in the new investment trend, is supported largely by investment trusts and insurance companies. Its sole aim is to supply capital for new ideas and developments. Because it has a corporate structure like a regular manufacturing company, it is not so restricted by blue sky laws of the states and can concentrate its investments more in individual firms than Growth Companies. Like Growth Companies, it lays great stress on research in the organizations in which it participates and has for its board of advisers Karl T. Compton, Edwin R. Gilliland and Jerome C. Hunsaker, all of Massachusetts Institute of Technology.

By Leaps and Bounds—The investment trust business has had a phenomenal growth. Today the industry can afford to take a few fliers into venture capital. At the end of 1940, investment companies were trustees for about $1.1 billion of capital. Today it has more than $3.25 billion and assets are growing at the rate of $500 million a year. Some 134 mutual funds are now operating in this country, compared with 75 a decade ago. More than 900,000 shareholders have varying interests in the funds—some with as little as $100 invested.

"The co-operative investing idea is a good idea," says the economist, Beardsley Ruml. "It gives investors, large and small, a means of putting their savings into the ownership of business, with diversification, with management and with liquidity." From that "good idea" is coming a new offshoot which may bring new financial strength and energy to industry.

Boost for Foreign Bearings

"Buy bearings abroad." That's the request the U. S. Department of Defense is making to prime contractors on defense work.

The request, says the department, stems from a temporary scarcity in the United States of precision type ball bearings and availability of this type in Europe. However, foreign purchases of bearings should be made only when no material and machine tools are required from the U. S., the Defense Department points out.

The department's recommendation follows a report of a Munitions Board survey group composed of consultants from the bearing industry and personnel from the armed services who made a study of available European facilities. They reported that capacity for certain sizes of precision instrument type ball bearings is avail-

able in Europe. The current rate of European production for export can be materially increased, beginning in three to four months from placement of orders. This rate of production can be expanded progressively during the coming year, the group reported.

If European manufacturers receive U. S. orders now, capacity at the expanded rates probably will remain available for consumption by other countries of the North Atlantic Treaty Organization, when U. S. production catches up with current demand, the report adds.

In addition to asking defense prime contractors to buy foreign bearings through U. S. bearing manufacturers and importers, the Defense Department asked American bearing makers also to negotiate independently with European sources. The department says that European companies will be able to supply instrument type ball bearings within three to four months after placement of orders.

Can We Keep It from Russia?

The question of banning free export of American know-how in the form of technical and trade publications again is under study this time by the Security Committee of the National Security Council. State Department, the most concerned government unit in the matter, blew hot and cold at different times since World War II. In the past year, State Department, while not formally trying to institute a ban, told inquiring publishers that it was desirable to prevent circulation of their publications behind the Iron Curtain. As a result, some publications have discontinued servicing subscribers in Russia and Russian satellite countries.

In other government quarters, though, it is thought that a clear-cut ban would be pointless, for Russians have the run of the United States and of western European countries and can freely pick up copies of such publications as they desire and mail them out in their diplomatic mail pouches. So, no ban by the National Security Council is expected. The most that is likely may be a ban on a few selected publications.

Little Atom Playing Bigger Role

The little atom is getting bigger in industrial importance.

Some of its by-products are now to be used to assist industrial organizations in studies of the applications of radiation to industrial processes.

Industrial concerns which want to see how small samples of their materials or products will react to exposure to radiation can now send them to Brookhaven National Laboratory, Upton, N. Y., where thousand-curie sources of gamma radiation are being made available.

The thousand-curie sources, made of cobalt-60 or tantalum-182, each release as much gamma radiation as 2.2 pounds of radium (an amount equal to the pre-World War II total world supply).

The sources were prepared as part of a program organized by the Atomic Energy Commission and university laboratories to determine the feasibility and safety of using radiation from by-products of nuclear reactors in killing bacteria, or initiating or accelerating chemical reactions.

Since materials exposed to radiation from the sources do not themselves become radioactive, the samples sent to Brookhaven by industry can be returned easily to the sender for analysis and evaluation of the results of their irradiation.

Exposure to large quantities of radiation from atomic energy by-products is known to induce chemical changes in molecules. Under intense gamma radiation bombardment, some molecules break into parts and then recombine in a different way.

Pacific Coast Will Be in Shipbuilding Business Again

SHIPS AHOY is the joyful cry on the West Coast these days.

The good news is that the San Francisco area is back in the shipbuilding business again with a tidy $17,465,000 contract anchored to the Shipbuilding Division of Bethlehem Pacific Coast Steel Corp. The Maritime Administration awarded the contract for five Mariner-class cargo ships, the last of 35 freighters to be ordered by the administration under its present budget. The other 30 ships were ordered from Eastern yards. Cost for the five West Coast vessels is $9,493,000 each.

Ships and Shore—Eighteen months ago shipbuilding employers and unions were asking for government assistance to keep the West Coast shipbuilding industry from foundering completely. The Maritime order will again bring bustling activity to one of the most famous of all Coast yards and the oldest in the country (in point of continuous operation). The contract will have an important economic and employment impact in the San Francisco area. Estimates are the Bethlehem yard will employ about 2500 new workers. There are 600 at present. Indirectly another 2500 jobs in the shipbuilding trades may be created. West Coast shipbuilding employment had dipped from almost 21,000 at the start of 1948 to less than 1000 at the start of this year.

The Mariner-type vessels will travel at 20 knots (about 23 miles per hour), about twice as fast as World War II's Liberty ships—and with 2½ times as much cargo. First vessel is scheduled to be delivered in 540 days, the others to come within the following 190 days.

Per Contract — The sprawling Bethlehem yard (it covers 100 acres) is one of the most integrated on the whole Coast. It has four floating drydocks, eight shipbuilding ways, over 14,000 feet of outfitting and ship repair piers. T. C. Ingersoll is general manager of the whole operation.

Work on the five vessels will begin as soon as materials and manpower are marshaled. Although there

AERIAL VIEW OF BETHLEHEM PACIFIC COAST SHIPYARD
. . . where five Mariner-type vessels will be constructed

are more than enough facilities to start work on the five ships almost simultaneously, they will have staggered delivery dates per contract.

Shipyard Employment Jumps

Employment in U. S. shipyards has increased more than 60 per cent since the start of the Korean war, says the Labor Department's Bureau of Labor Statistics.

In May, 1950, employment was at a postwar low of 132,400 workers; by May, 1951, it had increased to 216,900. Despite the sharp advance, employment was still far short of the World War II peak of 1.7 million. An estimated 40,000 additional workers will be added by the middle of 1952. Almost two-thirds of the workers in Navy yards and about 60 per cent of those in private yards are employed at Atlantic seaboard yards. Pacific yards employ less than a quarter of the industry's total labor force. Shipyards on the Gulf Coast, the Great Lakes and inland account for the remainder of the industry's employment.

Prefabs Speed Shipbuilding

Prefabrication of huge sections is being used to speed completion of the largest self-unloading vessel on the Great Lakes, now under construction for U. S. Steel's Bradley Transportation Co. at Manitowoc, Wis.

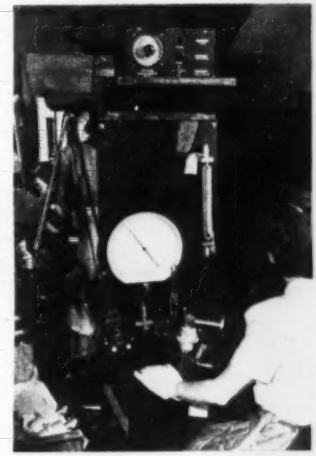
The hull of the 666-foot vessel is taking shape and present plans call for launching in November. The ship will be in commission for an early start in the 1952 lakes navigation season. Being built by Manitowoc Shipbuilding Co., the new vessel will be added to the six ships which now compose the Bradley fleet.

More Strikes, Less Lost Time

Strike idleness in the first half of 1951—about 10.4 million mandays—was almost 60 per cent less than in the same 1950 period and about 25 per cent less than in the first half of 1949.

The Labor Department's Bureau of Labor Statistics says that with exception of the textile disputes in the spring of this year, no large prolonged stoppages occurred in the January-June period. In the first six months of 1950, lengthy coal and automobile controversies contributed heavily to the substantially greater lost-time figures.

But the 2225 work stoppages that occurred in the first half of 1951 exceeded by about 100 the strikes recorded in the corresponding period of 1950.



SAMPLING MONITOR: In pilot operation at General Electric's Refrigerator Division at Erie, Pa., is the Continuous Sampling Monitor, a new device announced by the company's Special Products Division. The monitor makes practical application of continuous sampling methods to manufacturing processes. Method employs a statistically-designed combination of sampling and 100 per cent inspection

Battery Makers Worried

They're troubled about weather, buying habits of the users and the lead shortage

TODAY'S battery maker is uneasy about weather, concerned about the erratic buying habits of the automotive user and alarmed about directives from Washington that will restrict the use of lead.

For the weather, buying habits and lead have a marked effect on the battery business, particularly the automotive storage battery trade which accounts for 85 per cent of the total battery volume.

The Heat's On—Heat, not cold, is the killer of batteries. Heat during the summer can weaken an auto unit to the extent that it may fail during the first few cold snaps of winter when more strength is required. Indeed, many batteries fail even before the cold snaps, and the seasonal peak for auto battery sales is August and September. The heat this summer has not been unusual, so no extraordinary spurt in replacement business is developing. That factor, plus advance buying last year caused by the Korean war, is depressing auto battery sales just as the time comes for the usual business bonanza.

There are close to 1000 makers of batteries and battery components, most of whom make automotive batteries and components. Less than 100 companies account for the bulk of the sales. The industry produced about 31,131,000 units last year, 23,130,000 of which were replacements and about 8 million for original equipment. The industry believes it should produce about 22 million replacements in 1951, and 5 or 6 million original equipment batteries, depending on the number of cars and trucks assembled.

Bottleneck—The government quotas on the industry's use of lead—which one manufacturer termed "screwy"—may make it impossible for the manufacturers to turn out 22 million replacement batteries. Lead allocations go into effect Sept. 1 and probably won't seriously curtail the industry's activities this year, but will in 1952 if left the way they are. The allotment will be based on metal used in the first six months of 1950, despite the fact that lead consumption in the battery industry in the first half is normally only about 50 per cent that in the second half of the year. About one-third of auto battery sales usually are made in the first six months; two thirds in the second.

One answer to the lead shortage could be greater imports, but the drawback there is that foreign prices are higher than the ceiling domestic quotations. About a third of the lead used by battery manufacturers in 1950 was imported. This year much less—about 280,000 tons less—is being brought in.

For the Time Being—At the moment, there are enough automotive batteries because in the first six months of this year the industry had a lot of lead on hand and was able to build up supplies considerably by the time the pinch in lead really began to take effect. By the end of June, an inventory of about 5 million batteries existed because unusually heavy production brought inventory building in March. Battery makers normally start to build up their inventories early in May for the last half's peak.

The Score on Fast Writeoff

Rapid tax writeoff had been authorized through July 27 for 2882 new or expanded facilities. Total amount eligible for this rapid depreciation is $8,461,569,605, the Defense Production Administration reports.

This rapid tax writeoff program permits individuals, companies or corporations to amortize over a five-year period a specific amount of a new facility considered important to defense. Purpose of the program is

to expand private industry's productive capacity quickly to meet mobilization goals.

Fast Tax Writeoff Opposed

Don't grant any certificates of necessity for rapid tax amortization in our field, the Electroplating Industry Advisory Committee told the government. Existing electroplating facilities are adequate, the committee says in explaining why there should be no fast tax writeoffs by those who want to build new plants or expand those operating.

Discussing effect of current restrictions on use of metals for plating, the industry committee said any further reduction in availability of copper will seriously handicap the industry. The committee reported that some job plating firms have only a 30-day inventory of nickel. NPA said it is aware of the serious effect the nickel shortage is having on the industry but it does not expect to relax M-14 at an early date.

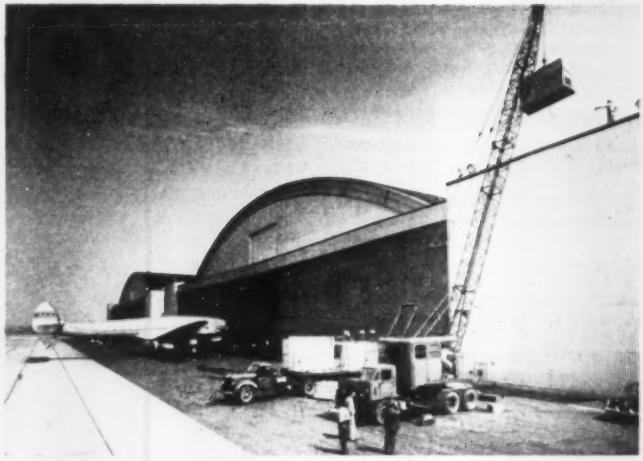
Chicago Looks at Defense

Nearly two-thirds of Chicago manufacturers responding to a questionnaire sent them by Chicago Association of Commerce & Industry report that they have defense contracts.

Some 96.7 per cent of the manufacturers holding contracts are actually in production on defense work. But half of those with contracts report that they are still tooling for some of the defense work they have been awarded. The association's survey, based upon a response from 400 manufacturing companies reveals that: Nearly three-quarters of the manufacturers responding are actively seeking defense contracts now; 72 per cent of those seeking contracts have been successful in acquiring them; and some manufacturers are receiving defense orders faster than they can handle them.

Half the manufacturers who have defense contracts are operating both as prime and subcontractors on defense orders. Another third are operating only as subcontractors, and the remaining firms report they are operating as primes only. Thirty-five per cent of the manufacturers with defense orders say that such orders involve less than 10 per cent of their total volume of production. Twenty-two per cent said defense production was taking up from 10 to 20 per cent of their capacity, and 26 per cent stated that defense work is occupying from 20 to 60 per cent of their total volume.

Most of the companies with defense work now expect to have even more six months from now.



COMING IN FOR A LANDING: A crane lifts a usAIRco refrigerated Kooler-aire unit atop a Pan American World Airways structure at New York International Airport. Two 20-ton air conditioning systems were installed in only three weeks' time to assure a comfortably cool summer for more than 500 employees

Blackout Partially Lifted on U. S. Award Data

ACTION THIS WEEK on a promise made six weeks ago by the Department of Defense finally permits a partial lifting of the blackout imposed on detailed government contract information since March.

The new policy, as outlined in STEEL (June 18, p. 48) puts limited dollar value and quantity data back on the Department of Defense synopses of awards published each week by the Commerce Department. Remaining restrictions limit this complete account to contracts ranging in value from $25,000 to $250,000. Awards exceeding $250,000 are so indicated, but actual unit quantities and dollar amounts are withheld.

All contracts included in STEEL's summary of government awards this week carry values that are in excess of $250,000.

Among contracts reported recently, exclusive of the government's synopses, one granted to Hercules Motors Corp. gets the company into production of 3266 motors with accessories at a cost of $1.6 million. Two awards to Willys-Overland Motors Inc. are valued at $1,456,000 and call for making 555 quarter-ton trucks and 1773 hard-top cabs.

PRODUCT	CONTRACTOR
Periscopes & Spare Parts	Eastman Kodak Co., Rochester, N. Y.
Radar Training Sets	Transducer Corp., Boston
Trainers—Ground Instrument Flying	Electronics Div., Curtiss-Wright Corp., Caldwell, N. J.
Control Panels	Aeromotive Equipment Corp., Kansas City, Mo.
Automatic Pilots for F-84F & RF-84F	Westinghouse Electric Corp., Pittsburgh
Automatic Pilot Components	Sperry Gyroscope Co., Great Neck, L. I., N. Y.
Turbosuperchargers	Hotpoint Inc., Chicago
Turbojet Aircraft Engines (3 contracts)	General Electric Co., Schenectady, N. Y.
Transmitters	Northern Radio Co. Inc., New York Hazeltine Electronics Corp., Little Neck, L. I., N. Y. Sylvania Electric Products Corp., New York Radio Corp. of America, Camden, N. J. Olympic Radio & Television Inc., New York
Dynamotors	Collins Radio Co., Cedar Rapids, Iowa
Radio Sets	Radio Corp. of America, Camden, N. J. Adler Communications Laboratory, New Rochelle, N. Y. Air Associates Inc., Teterboro, N. J.
Radio Compass Components	Fairchild Camera & Instrument Corp., Jamaica, L. I., N. Y. Kearfott Co. Inc., Little Falls, N. J. Magnavox Co., Ft. Wayne, Ind.
Amplifiers	Maxon Engineering Div., W. L. Maxon Corp., Norwich, Conn.
Recorder Reproducers	Daystrom Electric Corp., Poughkeepsie, N. Y.
Microwave Systems	Philco Corp., Philadelphia
Regulators & Generators (2 contracts)	Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
Mobile Training Units (complete)	Douglas Aircraft Co. Inc., Santa Monica, Calif.
Helicopters	Piasecki Helicopter Corp., Morton, Pa.
Aerial Delivery Kit Components	Unity Industries, Guthrie Center, Iowa
Wheel & Brake Assemblies	Lite Mfg. Co. Inc., New York S. Buchsbaum & Co., Chicago Polan Industries, Huntington, W. Va. Bendix Products Div., Bendix Aviation Corp., South Bend, Ind. Goodyear Tire & Rubber Co. Inc., Akron
Cycle Reconditioning of Aircraft	Pacific Airmotive Corp., Burbank, Calif.
Bomb Hoists	Steel Products Engineering Co., Springfield, O.
Stand Assemblies	Greer Hydraulics Inc., Brooklyn, N. Y.
Hydraulic Test Stands	Sprague Engineering & Sales, Gardena, Calif.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Controlled Materials Plan

ORDER ACCEPTANCE—Amendment 2 to CMP Regulation 1 states that a controlled materials producer who is not required or is unable to accept an order for delivery in the month specified by his customer, but has open space on his schedules during the next two months, must accept the order and fill it as soon as possible, if this is satisfactory to the customer. If this would mean delaying delivery into a later quarter the order may be accepted only if the customer certifies that he holds an allotment valid for the later quarter. In such cases the customer must charge the delivery to that later quarter. Amendment 2 was issued Aug. 1, 1951.

DELIVERIES — Direction 5 to CMP Regulation 1 stipulates that if a purchaser, through no fault of his, did not receive the full amount of controlled materials originally ordered for second quarter delivery, this undelivered amount shall not be deducted from his third quarter allotment. If a purchaser placed an order in the second quarter for delivery in the third quarter, he must deduct the amount of such materials from his third quarter allotment regardless of whether they were obtained by an authorized CMP order, a rated order or an unrated order. Direction 5 was issued July 30, 1951.

Materials Orders

TIN—Amendment of July 26, 1951, of NPA Order M-8 corrects typographical errors in the July 1 amendment of the order.

LEAD—NPA Order M-76, issued July 26, 1951, places soft pig lead under NPA allocation Sept. 1, 1951.

LEAD—Amendment of July 26, 1951, of NPA Order M-38 removes all restrictions on distribution of lead and lead products Sept. 1, 1951. These restrictions have been incorporated in M-76.

COMMUNICATIONS — NPA Order M-77 issued July 27, 1951, provides priorities assistance to the nation's operating communications industry in obtaining certain materials for maintenance and expansion.

CONSUMER DURABLES — Direction 2 to NPA Order M-47A permits manufacturers of consumer durable goods whose second quarter use of steel, copper and aluminum was based on adjusted base period figures to use these adjustments in computing permitted use of these materials during the third quarter. Direction 2 was issued July 27, 1951.

ALUMINUM FOIL — Amendment of July 27, 1951, of NPA Order M-67 broadens that order to include all types of aluminum foil except insulation foil. Some of the uses now governed by M-67 had been controlled by M-7, which was revoked July 1.

CADMIUM — Amendment of July 30, 1951, of NPA Order M-19 permits increased use of cadmium in a wide range of military and civilian products. The cadmium order was amended because inventories of the metal have been backing up in the hands of producers, pending an increase in defense orders. M-19 had restricted the use of cadmium almost exclusively to production of war implements and essential civilian products.

NPA Delegation

ATOMIC ENERGY — Amendment of July 27, 1951, of NPA Delegation 2 authorizes the Atomic Energy Commission to allot controlled materials and to redelegate this right to other federal agencies engaged in AEC projects. The amendment was effective July 27.

Price Regulations

MANUFACTURER DEFINED—Amendment 18 to Ceiling Price Regulation 22 of the Office of Price Stabilization makes it clear that the definition of manufacturer does not include a person who merely rebuilds, reconditions, renovates, renews or otherwise restores a used commodity. Amendment 18 was issued July 27, 1951.

COPPER — Supplementary Regulation 46 to the General Ceiling Price Regulation of the Office of Price Stabilization permits sales at 27.5 cents a pound of certain quantities of refined copper by refiners using imported raw materials. Ceiling price for the basic domestic grade of electrolytic refined copper remains at 24.5 cents, Connecticut Valley. SR 46 was issued July 25, 1951, and made effective on that date.

TUNGSTEN STEELS — Notice was given by the Office of Price Stabilization July 26, 1951, to producers of tungsten-containing products that they may now advance their prices for these materials to the ceilings established by Supplementary Regulation 42 to the General Ceiling Price Regulation without giving OPS 20 days' notice. SR 42 raised ceilings on high speed tool steels, specialty steels and other tungsten-containing metal products. Leading makers of these materials were among the steel companies which signed an agreement with the government that they would not increase iron and steel prices above the Jan. 15, 1951, level without giving 20 days' notice.

MANUFACTURERS — The manufacturers' general ceiling price regulation, CPR 22, was republished July 27, 1951, to incorporate the text of amendments 1 through 17.

COPPER ALLOY SCRAP—Amendment 1 to Ceiling Price Regulation 46 rolls back prices of all grades of copper alloy scrap containing tin to levels reflecting a value of $1.15 a pound for tin. This value is slightly above the current market, but the tin price fluctuates frequently and it is hoped the $1.15 figure will hold prices on these scrap grades steady for a reasonable length of time. The $1.15 figure replaces a $1.50 figure. The amendment is effective Aug. 6, 1951.

BRASS MILL SCRAP—Amendment 1 to Ceiling Price Regulation 47 rolls back prices of all grades of brass mill scrap containing tin to levels reflecting a value of $1.15 a pound for tin. The $1.15 figure replaces a $1.50 figure. The amendment is effective Aug. 6, 1951.

REMELT ZINC—Supplementary Regulation 48 to the General Ceiling Price Regulation rolls back remelt zinc prices to bring them into line with ceilings set for zinc scrap on June 1, 1951, under CPR 43. New ceiling prices before allowable transportation charges are: 17.25 cents a pound for material with a minimum zinc content of 97.5 per cent; and 12.25 cents a pound for material with a zinc content below 97.5 per cent. SR 48 is effective Aug. 6, 1951.

EXPORT PRICES—Ceiling Price Regulation 61 limits export sales prices to the domestic ceiling price plus exportation costs and plus the same percentage markup obtained on deliveries between Jan. 1, 1949, and June 30, 1950. CPR 61 supersedes most General Ceiling Price Regulation provisions applying to exports and all export provisions of CPR 22, the general manufacturers' order, and CPR 30, the machinery manufacturers' order.

IMPORTS—Amendment 6 to Ceiling Price Regulation 31 provides an effective date of Sept. 1, 1951, for CPR 31, which sets up pricing formulas for sales of imported goods. A seller may make the regulation effective at such earlier date as he files the list required by Sections 5 and 6 of the regulation.

New Order for Castings Prices

Pricing controls over metal castings are being transferred to a specially tailored regulation, Ceiling Price Regulation 60. They have been under the General Ceiling Price Regulation of the Office of Price Stabilization.

CPR 60 will be effective Sept. 1, 1951, or at such earlier date between Aug. 1, 1951, and Sept. 1, 1951, as a seller may select.

The new regulation, OPS says, was issued because serious distortions in the price structure of many producers had developed. In general, ceiling prices are determined under the new regulation on the basis of prices at which castings were sold on Jan. 25, 1951, with adjustments to reflect changes in costs of metals between that date and the issuance of the regulation.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The Justice Department looks with jaundiced eye on trade association officials who are advisers or consultants to defense agencies. E. A. Schoefer was one who had to leave

THE FOUNDRY INDUSTRY suffered a great loss when E. A. Schoefer was severed from his connection with NPA Iron & Steel Division's Metallurgy & Conservation Branch. (E. J. Hergenroether, on leave from International Nickel Co., is its head.)

Mr. Schoefer is going to be missed more than a little bit because he is well qualified to advise the high-alloy castings industry on its problems. He is really a victim of the Justice Department's ruling that trade association officers may not serve the government as consultants or as members of industry advisory committees. Mr. Schoefer happens to be executive secretary of the Alloy Castings Institute, Mineola, N. Y.

The Gimlet Eyes Years ago the Justice Department looked upon trade associations as hotbeds for developing tricky methods or reaching price agreements and otherwise violating antitrust laws. The fact that trade association officials in the past have been right on matters of pricing seems to have made no difference to the gimlet-eyed men in the Justice Department. The attitude amounts to this: Trade associations are suspect and defense agencies should give them no recognition.

Defense agency men, of course, like the trade association executives: They're an informed lot, knowing their industries inside and out, for the most part. And they're usually in a position to give invaluable aid. But that cuts no ice in the Justice Department deep-freeze.

Proper Mixture Under the arbitrary Justice Department policy, only bona fide industry men selected in a proper mixture from different sections of the country and from large and small companies may be members of industry advisory committees.

What will happen to trade association men now serving with NPA divisions and sections as consultants? (There are a number of them left in the Iron & Steel and other divisions.) They're keeping their fingers crossed.

Help for India, Pakistan . . .

First contracts for the export of industrial know-how under the Point Four program (contracts previously let have involved assistance in the fields of agriculture, health and education) were placed by the Office of International Trade with Armour Research Foundation, Chicago, and General Railway Signal Co., Rochester, N. Y.

The contracts call for assistance to India and Pakistan. For India, Armour technicians are to map out a program for expanding small-scale industries, with special attention to improving practice at the many small foundries in that country, and improving efficiency at cellulose and paper producing plants. For Pakistan, Armour men are to better the operating techniques and equipment of Pakistan steel mills.

General Railway Signal Co. is to recommend signalling and traffic systems for the Pakistan Railway.

Defense Agency Appointments...

New industry men in NPA's Iron & Steel Division are:

William A. Thompson, Wyckoff Steel Co., Pittsburgh, is chief, Cold Drawn Bar Section, succeeding E. C. Koester, Pilgrim Drawn Steel Corp., Plymouth, Mich. . . . Ray Thulean, Inland Steel Co., Chicago, is chief, Rails & Track Accessories Section, a new unit . . . C. T. Hapgood, Jones & Laughlin Steel Corp., Pittsburgh, is chief, Pipe Section, succeeding J. W. Owings, Youngstown Sheet & Tube Co., Youngstown, O. . . . Robert Smice, Columbia Steel Co., is chief, Structural Shape Section, succeeding Thomas E. Dalby, Bethlehem Steel Co. . . . John Walker, United States Steel Co., is chief, Bar & Semifinished Section, succeeding Henry P. Rankin, Republic Steel Corp. . . . E. D. Eckford, Bethlehem Steel Co., is chief, Plate Section, succeeding Max Hoffman, United States Steel Co.

Francis Juraschek, director of commercial research, United States Steel Co., Pittsburgh, was appointed director, Steel Area, Office of Program & Requirements, Defense Production Administration. He is located at 4G1 new GAO Bldg.

Max W. Eward, Republic Steel Corp., Cleveland, joined the Defense Solid Fuels Administration, Interior Bldg., Washington, as industrial consultant on coke production.

Fred R. Toothman, on leave from his job as mining engineer for the Chesapeake & Ohio Railway Co., and William B. Young, formerly with Eastern Gas & Fuel Association, as supervisor of the installation of mining equipment, were appointed technical advisers in DSFA's Equipment & Materials Division.

NEA

AIR POWER: Harold R. "Bill" Boyer, on leave from General Motors where he has been production engineering director since 1946, is now the big boss of all U.S. aircraft production. His titles: Deputy administrator for aircraft production, chairman of DPA's Aircraft Production Board. Defense Mobilizer Charles E. Wilson (right), who administered the oath to Mr. Boyer, congratulates him. Looking on (center) is National Production Administrator Manly Fleischmann who also holds the job of defense production administrator

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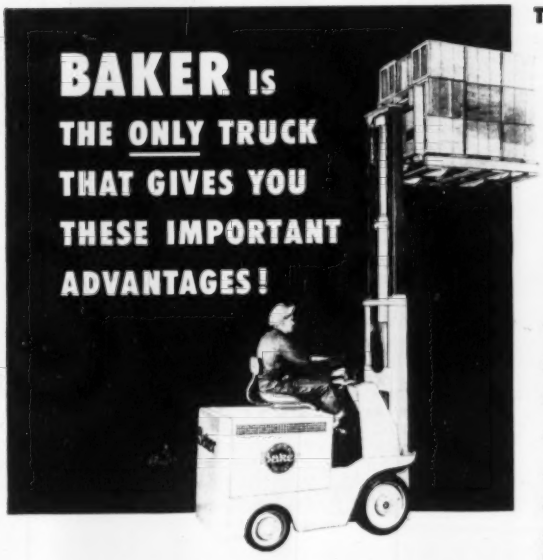

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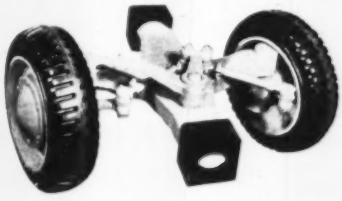

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The Harrisburg Gas Co.

HAS GONE A LONG WAY IN THE PAST 100 YEARS

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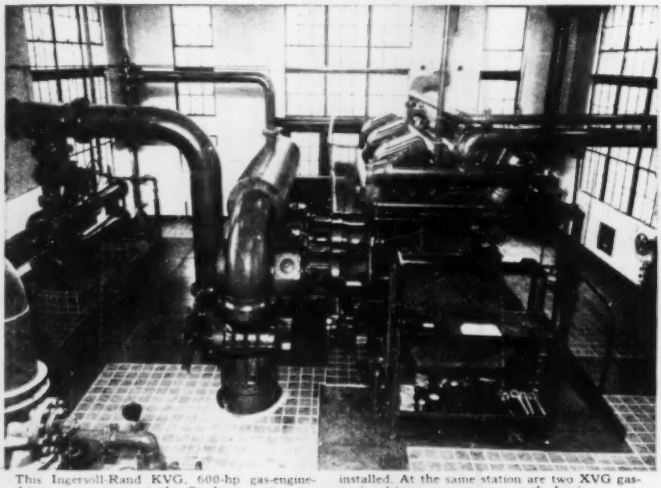
During the past century of progress, The Harrisburg Gas Co. has always placed the emphasis on *continuity of service*, which can be secured only by *quality of construction*. That's one of the reasons why it has repeatedly specified Ingersoll-Rand Compressors and Blowers for all major installations.

The *proved dependability*, operating economy and low-cost maintenance of I-R equipment have become almost a tradition in the gas industry. It took years of experience to build up this reputation—experience in the design, manufacture and application of air and gas handling equipment to meet the rapidly changing needs of the industry. All of this experience is at your disposal—no farther away than your nearest I-R representative.

. . . with the help of dependable I-R equipment like this

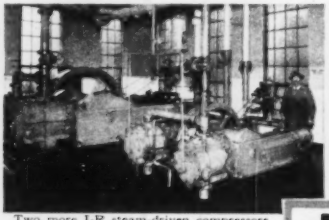


This Ingersoll-Rand KVG, 600-hp gas-engine-driven compressor at the Steelton station can pump 335,000 cubic feet of gas hourly, at 34 psi pressure. A duplicate KVG is currently being installed. At the same station are two XVG gas-engine-driven compressors, each having a capacity of 120,000 cfh.

I-R centrifugal blower, supplying combustion air for oil and gas burners in catalytic cracking furnace. Another I-R blower is used for pressure boosting.

I-R steam-driven compressor, of 277 cfm capacity, supplying process air to the cracking furnace at 20 psi.

Two XPV steam-driven 150,000 cfh compressors handling high-pressure distribution for the Harrisburg station.



Two more I-R steam-driven compressors on high-pressure distribution at Harrisburg. The unit at the right has been in service since 1914.

I-R Type 30 compressor supplying 60-psi air for operating the cracking-plant control instruments.

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Europe's New Goal: Greater Productivity

Marshall nations will count on American aid—public and private—in their drive. ECA estimates the countries' gross product can be increased by $100 billion

AMERICAN aid — both public and private—will figure heavily in a new drive to boost Europe's productivity.

ECA aims to help Western European nations to increase their annual gross national product by $100 billion. Up to now, the agency has put some emphasis on productivity, but its main job has been rehabilitation. That emphasis will now be reversed.

Administrative Shifts — To help make the change, a new ECA post has been created, that of assistant administrator for production. It will be filled by William H. Joyce Jr., formerly assistant administrator for operations. ECA hopes to persuade the Marshall Plan countries to form a joint productivity group, much like the Organization for European Economic Cooperation, to gain the maximum benefits from U.S. technical aid.

More European productivity teams will be coming to the U.S., and the practice of sending American teams to Europe will be expanded. The first of the latter groups, the U.S. pressed metal productivity team, has just returned from England. One finding of that team is that the British stamping industry would benefit with the organization of a trade association for the entire field. To further productivity, ECA will also enlarge its industrial staffs in Europe and will establish a pool of skilled specialists in various industries. Men from that pool will be available to Marshall Plan countries for advice.

Private Help—Assistance in Europe's drive for increased productivity won't come from the U.S. government alone. Aid from private U.S. sources may also eventually boost Europe's productivity. Battelle Memorial Institute, the independent industrial research foundation in Columbus, O., will establish a European branch of its laboratories to serve Europe beginning next year.

The institute has just completed a survey of scientific and industrial conditions in Europe. It finds that America has much to offer Europe, particularly in applied engineering, but that European science has much to give American scientists, especially in fundamental knowledge and research. Exact location of the European branch will depend upon the outcome of negotiations now in progress.

Proof Positive—Evidence that Europe has already made productivity gains lies in statistics on steel exports to the U.S. They have risen 900 per cent since last October. Actual shipments—which increased from a rate of 250,000 tons yearly last October to a rate of 2.5 million tons now—are still small in terms of total U.S. production, but they help. National Production Authority says that one out of every five steel rods fed into independent U.S. wire mills in the first three months of 1951 came from Europe. Europe supplied one out of every eight tons of steel plates that went to small independent factories in the first quarter.

NPA has encouraged steel imports by allowing American fabricators to use the steel to augment domestic allotments, without figuring it in their quotas. Hitherto, they have had to figure it in their total quotas.

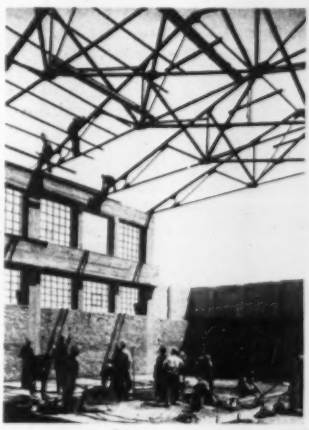
U.K.'s Abbey Steel Plant Rolls

Britain hopes its steel industry's productivity will soar with the opening of the Abbey Work of Steel Co. of Wales Ltd. near Port Talbot.

Erected with Marshall aid, the mill took four years to erect, cost $168 million and is the largest in Europe. The plant will have the capacity to turn out 2 million tons of steel annually, most of which will be rolled into sheet steel and tin plate.

The Ruhr Has Doubts

West Germans fear that productivity will be hampered by the establishment of the new steel companies.



Wide World

The much debated and discussed Allied directive—No. 27—to reorganize the Ruhr steel industry has at last been implemented.

Four new companies have been carved out of Vereinigte Stahlwerke AG., once the largest steel producer in Germany. They have been named Rheinische Rohrenwerke AG., Huttenwerke Ruhrort-Meiderich AG., Gusstahlwerk Witten AG., and Busstahlwerk Oberkassel AG. A fifth new company, Stahlwerke Bochum AG., will take some of the facilities of the old Otto Wolff combine.

The scrap shortage is another threat to the steel industry's productivity. An allout drive has just started to boost scrap generation from 550,000 tons a month, the present rate, to about 700,000 tons. German political leaders, as well as steel men, are anxious to boost the scrap take because Britain has just agreed to abolish the Allied Ruhr Authority if she is assured the monthly delivery of 110,000 tons of German scrap.

Spanish Railroads Get Help

Spain needs better railroad facilities to boost her productivity.

The Export-Import Bank has granted a credit not to exceed $7.5 million to Spanish National Railway System.

The Spanish National Railways, established in 1941 as an autonomous public enterprise, accounts for about 80 per cent of the mileage of all railroads in Spain, having 8000 miles of track, more than 3000 locomotives and more than 74,000 freight cars.

The U. S. credits will help finance three types of purchases: Rails and accessories up to $1.3 million; signaling equipment up to $1.2 million; and electric locomotives and substations and other related equipment up to $5 million.

AID AND ADVICE: A rolling mill that will produce steel sheets and tin plate is being erected at the Port of Piraeus in Greece—with American aid and advice. Steel bars from which the sheets and plate will be rolled will have to be imported, but final finished costs will be lower for Greece's industrial effort. The country is mainly dependent upon Western Europe and the United States for her finished steel needs. Because of the increased demand for finished steel under the joint defense effort, Greece's growing industrial might will be able to contribute its part in the effort to strengthen the free world

FIELD COOK STOVE

COOKING OVEN

FORK-LIFT TRUCK

"BLITZ" CANS

Don't Forget the Quartermaster

That branch of the service not only buys food and clothing for the Army but many metalworking products like stoves, ovens, fork-lift trucks, trailers and other mobile units

PROCURING things as small as can openers and large as mobile bakery units, as specialized as deep fat fryers and as general as steel drums is part of the job of the Army Quartermaster Corps.

In all, the Quartermaster purchases and procures 82,000 items, a good many of which spell big business to the metalworking industry. Last fiscal year alone, for example, it bought 21,000 large baking sheets, 58,000 large round cake pans, 70,000 stainless steel pitchers, 1200 kitchen ranges, 20,000 field ranges, 3500 stainless steel coffee urns, 97,000 small cooking outfits.

Lest the Quartermaster be accused of thinking only of things to eat, though, it should be remembered that it buys clothing and other equipment —even the things that get and keep food and clothing in or on order. It buys equipment to handle cases of food and trailer units for repairing clothing, textiles and shoes.

Down Metalworking's Alley — Because it is outstripped dollar-wise and tonnage-wise by Ordnance, Engineers and the Signal Corps in the Army, the Bureau of Ships in the Navy and the Air Force, the Quartermaster may be forgotten as a likely sales prospect. Take materials handling equipment, for example. It's not the usual end-type item used by military personnel, yet it is essential in the handling of thousands of items that the Quartermaster must shift around depots, to trains, trucks and ships. And the equipment it buys for handling materials constitutes its largest metal tonnage procurement.

Fork-lift trucks are among the main types of materials handling equipment for Quartermaster—from a procurement and from a useful standpoint. The type of truck it wants it says is: A four-wheeled automotive unit that enables a man to pick up a unit load, carry it to its destination and stack it as high as 14 feet.

Instructions on the use of the trucks recommend: To make the most use of the fork-lift truck, it should be used in conjunction with a tractor-trailer train whenever the horizontal difference of the load to be carried is 250 feet or more. Electric and gasoline-powered units are used.

On Schedule—Several dozen types are used in Quartermaster depot and warehouse operations here and overseas. Among the most important types now under procurement is the gasoline powered 3500-pound fork-lift truck.

Last fiscal year 3000 trucks of varying sizes were bought. More are on this year's schedule.

Gravity conveyors are another major procurement item. Quartermaster bought over 24,000 of them in the last fiscal year—ranging from short jobs to more intricate affairs that carry cases of subsistence or other supplies around corners. Gravity wheel conveyors (small wheels mounted on horizontal axles within the conveyor frame) and gravity roller conveyors (moving parts are steel rollers horizontally mounted in a conveyor frame) are the two general types used.

Tractors, Trailers, Trains—Warehouse tractors are more of the "big stuff" that Quartermaster uses, but last year's procurement was for only 300. More will be bought this year, and they'll be used to tow trailer loads. Like fork-lift trucks they may be either gasoline or electric-powered. They must be powerful enough to pull loads of practical size, yet small and maneuverable enough to move in the limited space of crowded warehouse and storage areas. They may be used for direct drag-towing along the floor (on skids), for pulling one or two trailers, or for towing a long train of trailers. In the latter system the tractor acts as a locomotive for a trackless train of the trailers. The train moves through the storage area, spotting trailers at intervals.

Quartermaster procured about 2600 warehouse trailers of the type used with the warehouse tractors in the past fiscal year. They're still needed. Essentially four-wheel trucks designed for a big load, they must be steered simply and coupled swiftly to the towing units. They're about 3 x 6 feet in platform dimensions.

Rolling Their Own—Intriguing special purpose units that the Quartermaster is buying are bakery units, (they include ovens, mixing machines, proofing troughs, even overhead rails for moving the dough), mobile laundries, field bath units, clothing and shoe repair shops on wheels.

The mobile laundry includes washers, dryers, boilers and other equipment necessary for cleaning clothes up front. Each unit weighs more than 5 tons. Over 500 of them were bought last year; more are on current procurement. About 400 mobile field bath units were bought, and 250 two-wheel semitrailer units for repairing textiles, clothing and shoes were pur-

GRAVITY CONVEYOR

BARRELS AND DRUMS

MOBILE TAILOR SHOP

SHOE REPAIR UNIT

chased during the last fiscal year.

Blitz Again—One of the biggest items unit-wise is the 5-gallon cans, famous as the "blitz" cans in World War II. They're used for water and for gasoline — not interchangeably, though—the water cans are more hygienically finished inside. Procurements in 1951 of water cans will run around 1.5 million, gasoline cans 7.5 million. Quartermaster also buys 55-gallon drums, took 2.5 million last fiscal year.

An interesting sidelight on the Corps' petroleum products containers is still another mobile unit that its Research & Development Branch is testing. It's a drum cleaning and reconditioning plant that can get into rear battle areas and de-dent and otherwise recondition drums. Not only will a great deal of steel be saved by such a mobile plant, but shipping time and storage space can be cut—both of which are important during a war.

Quartermaster, though not a big customer, is a steady one, returning to metalworking's store year in and year out. Prosaic as most of its purchases are they make up two-thirds of the phrase "best-clothed, best-fed best-equipped Army in the world."

DTA Outlines Rail Flood Loss

Preliminary surveys of damage done to transportation by the Kansas-Missouri flood, show railroads are the heaviest sufferers. Chief emergency need, Defense Transportation Administration officials report, is for steel to repair and replace flood-swept railroad bridges and damaged electrical apparatus of rolling stock.

In yards of the several roads more than 7000 freight cars were under water, 2000 were derailed and about 70 diesel units were submerged. Disposal of 2500 carloads of water-soaked grain presents another hard problem.

Outlining steel requirements, DTA says National Production Authority already has arranged for shipment to replace the Rock Island's Topeka mainline bridge; the Santa Fe needs steel for two spans at Topeka; other roads must replace or repair smaller structures. Little rail was actually lost, but much was bent too badly for use and will be replaced.

Columbia Helps Control Smog

Columbia Steel Co.'s smog control equipment is complete and in operation at the company's Torrance, Los Angeles, plant.

The U. S. Steel subsidiary installed electrostatic precipitators at outlets of its four open hearth furnaces where they act as magnets to purify smoke and fumes. More than 13,000 cubic feet of waste gas per minute is diverted to the cleaning equipment, which also removes between 75 and 240 pounds of metallic dust every hour in the cleaning process.

Research Corp. of New York designed and built the precipitators at a cost of $600,000. Construction took about 13 months.

Dallas Builds at $75 Million Pace

Construction is in progress in Dallas on 31 major structures—costing $500,000 or more each—with an aggregate cost conservatively estimated at $75 million.

Largest project is the 36-story Republic National Bank Building. Largest metalworking job is Ford Motor Co.'s $4.5 million assembly plant addition.

Westinghouse Powers New Mill

A huge single flywheel generator set—powered by a 9000-horsepower motor—will be made by Westinghouse Electric Corp. as part of a multi-million dollar contract awarded by Detroit Steel Corp. Westinghouse is committed to supply the electrical equipment for Detroit Steel's new 72-inch slabbing mill to be erected in Detroit.

The generator's 65-ton flywheel has a capacity of 250,000 horsepower-second stored energy and is expected to insure uniform drain on the mill's power supply.

Other equipment included in the order are the mill's main and auxiliary drives, alternating current and direct current auxiliary power equipment.

Koppers Enters Metalcast Co.

An interest in Continuous Metalcast Co. Inc., New York, has been sold to Koppers Co. Inc, whose Freyn Engineering Department will make and sell continuous casting machines licensed by the New York firm.

Koppers joins three other companies, Allegheny Ludlum Steel Corp., Scovill Mfg. Co. and American Metals Co. Ltd. on the board of directors of Continuous Metalcast. Interests of the others were not diminished by Koppers' entry. Irving Rossi, Metalcast president, says licensing to use the processes will continue through his company.

Louis Allis Passes Half Century

Louis Allis Co., electric motor manufacturer in Milwaukee since 1901, celebrates its 50th anniversary this year. Founded by Tom Watson as the Mechanical Appliance Co., the title was changed in 1922 to bear the name of its president and director from 1903 to 1945.

Anniversary issue of the company publication, "Louis Allis Messenger," says the firm made direct current motors in an abandoned shoe factory for five years to get its start. After moving to its present location at 427 E. Stewart St. in 1906, a first line of alternating current motors was developed in 1908.

From Bumper to Tailgate . . .

N-A-X HIGH-TENSILE STEEL

Reduces Deadweight and Increases Durability

The widespread use of N-A-X HIGH-TENSILE steel in transportation equipment emphasizes two vital characteristics of this high-strength low-alloy steel.

1. *Strength with less deadweight.* N-A-X HIGH-TENSILE steel reduces deadweight . . . of great importance in transportation equipment and military vehicles.
2. *Exceptional durability.* N-A-X HIGH-TENSILE steel, with its high strength and toughness, has proved greater resistance to fatigue and impact at normal and sub-zero temperatures. Its inherent structure and composition greatly reduce the effects of abrasion and corrosion.

The response of N-A-X HIGH-TENSILE steel to severe cold-forming operations and its excellent weldability by electric arc or resistance, atomic hydrogen or heliarc, and all other processes, are added important characteristics of N-A-X HIGH-TENSILE steel.

The "Eager Beaver"

The use of low-alloy, high-strength steels in military equipment assures longer life with less deadweight.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By A. H. ALLEN *Associate Editor*

Mirrors of Motordom

The hottest plating news in years around Detroit is the "white brass" underplate which may be the answer to the shortage of nickel for automakers

DETROIT

PLATERS supplying automotive hardware and trim details—and that includes the captive plating shops of the industry—have been slowly going berserk trying to figure out some way to circumvent the shortage of nickel and still turn out bright metal parts that will look right and stand a chance of fending off attacks of road grime and weather.

Their efforts have taken many directions, and none of them too successful. There is bright zinc plate, with a bake to take out the iridescence, and a chromate dip and a clear lacquer. There is a straight copper plate with a flash of chrome and perhaps some lacquer. There are other variants, but none of them will stand up under the salt spray test to the specified limits of the old copper-nickel-chrome combination. True, the cars have been going out, with precautionary tags attached telling owners to go easy on cleaning bright metal.

In Sight?—The answer may be in sight. Just as it always does, the auto industry when hard pressed turns on the heat and sooner or later, usually with the co-operation of suppliers, an answer is found. This time it is shaping up in form of what is called a "white brass" underplate to take the place of copper and nickel. It's the hottest plating news in years around Detroit and has been kept tightly under wraps.

"White brass" plating is a development credited to DuPont. Essentially it involves a cyanide type of plating solution, with certain brighteners and addition agents, plus anodes of approximately 80 per cent zinc and 20 per cent copper. It can be applied to any metal—die cast zinc, brass, steel—with conventional equipment and with a plating cycle slightly slower than bright zinc. Thus far, maximum thickness has been 0.0003-0.0004-inch, which is followed immediately by a chrome flash since the white brass will tarnish unless thoroughly rinsed in cold water and dried. Samples of the new plating have withstood up to 48 hours in the salt spray test, against 16 hours now written into specifications covering copper-nickel-chrome.

GM Tries It—General Motors has just approved the method in its specification No. 4390-M and the Ternstedt Division of the corporation has at least one 400-gallon tank in production, more being scheduled shortly. An independent plating plant has been experimenting with white brass for well over two months and is highly enthusiastic over the possibilities. At present it will be confined to interior parts, although this company feels it will be only a matter of time until the brittleness encountered in thicknesses over 0.0003-inch will be licked and the coating can be used on plated parts for exterior use.

Principal solution addition agent used thus far has been molybdic acid, made from molybdic oxide. At first it was feared restrictions on molybdenum might put the binger on molybdic oxide. Now it appears platers can use up to 200 pounds of contained molybdenum per month, which means 300 pounds of oxide, enough to take care of considerable volume of plating solution, since it is used in only small amounts. Further, it is understood some new types of addition agents are about to be introduced which will dispense with the need for molybdic acid and permit wide variations in current densities, perhaps as much as 5-100 amperes per square foot.

Flies in the Ointment—White brass plating is nothing any job shop can launch into overnight. Control of the system is critical. Anodes must be cast carefully of high purity metal, not the easiest thing for a foundry to do in view of high percentage of zinc. The beauty of the deal is that parts come out of the solution with a mirror finish, requiring no buffing, and after a chromium strike cannot be differentiated from the standard copper-nickel-chrome finish. In fact, some parts people insist that if everything goes well you can forget about ever going back to the copper and nickel type of underplate.

While on the subject of plating, it is interesting to note work of the University of Michigan's engineering research institute in the development of a light weight storage battery capable of starting an engine at 65 below zero. Weight was saved by

UNTOUCHED BY HUMAN HANDS: Automatic transmission cases progress through 190 milling, drilling, boring and spot facing operations at Ford's Cincinnati plant. The transfer machine consists of a line of machine tools joined by conveyors. It measures 152 feet long and has 76 work stations

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substituting for the conventional lead-antimony grid cores lighter metals such as aluminum, brass, iron or copper which are given an electroplating of pure lead. The coating protects the lighter cores from the sulphuric acid electrolyte and improves the battery's performance over a wide temperature range. Research work was done for Army Ordnance.

Money Being Made

There's money being made around this town—barrels of it. Some of it is sticking to the fingers of the hard and brittle "downtown" boys who figure out cute setups like selling the Detroit Tank Arsenal gears for $17 which cost only $4 to manufacture. More seems to be just rolling into the till of older established companies trying to keep pace with the demands of a combined auto-defense program.

Caught in the whirlwind was Brig. Gen. D. J. Crawford, former head of the Ordnance Department's Tank Arsenal here, fired for accepting a Washington hotel room as a guest of a contractor and for sending steel from Detroit to Maryland where he was constructing a sailboat in his odd hours. In the motor capital the distribution of largesse from buyer to seller is almost routine in these times.

Machine Tool Talk Just Talk

Talk of hiring the automotive industry to build machine tools in the present emergency is pretty largely just that. Some months ago the Air Force at Wright Field decided it needed several hundred Bullard automatics and that the place to get them was Fisher Body Division of General Motors, inasmuch as this company built some Bullards at one time during the last war. So, Bullard sent blueprints and specifications along to Fisher Body, where the engineers went into a compounded huddle to try to arrive at a price. What they came up with was a figure about 2½ times Bullard's own ceiling prices on the vertical turret lathes, so the whole pitch was classified as "operation futile" and still rests in a pigeonhole somewhere in Washington.

The machine builder was perfectly willing to co-operate but knew, as did most of the people at Fisher Body, that you cannot build machine tools in an automotive plant. Special equipment is required, particularly for precision finishing, which the auto plant just does not have. It can rough out components perhaps but when it comes to turning out the finished machine it would require an investment beyond all reason, not only in equipment but in personnel also, which would make the whole thing look pretty silly.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,878
February	658,918	505,583
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,673	897,853
Six Mos.	4,137,195	3,941,878
July		746,801
August		842,335
September		760,847
October		796,010
November		833,874
December		671,622
Week Ended	**1951**	**1950**
July 7	98,087	137,731
July 14	117,747	194,073
July 21	128,017	187,339
July 28	131,462	191,978
Aug. 4	100,000*	175,572

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Ford Ups Rouge Steel Capacity

Ford Motor Co. will spend $43 million to expand and modernize steel operations in its Rouge plant, adding 190,000 tons of annual finished steel capacity, says Del S. Harder, vice president—manufacturing.

Scheduled are 37 new coke ovens, a new sinter plant, installation of new pig casting equipment and extensive improvements in the open-hearth and rolling mill facilities. A portion of the added coke capacity is earmarked for the new Ford foundry in Cleveland. Alterations in the blooming mill will permit rolling of slabs up to 60 inches wide. Coil weights in the cold rolling mill will be increased up to an average 87 per cent.

In addition to facility and by-product improvement, a new 647-foot ore carrier is scheduled for completion for the start of the 1953 shipping season on the Great Lakes. It will be the third Ford vessel in lake service.

Even after expanding, the company will continue to buy more than 50 per cent of its steel.

McLouth Seeks Financing

The steel industry in eastern Michigan would like to know what Don McLouth proposes to do with his $96 million certificate of necessity for expansion of his mill at Trenton, Mich. In the first place, of course, the certificate does not produce any money, despite the evidence of the government's faith in McLouth's plans. Financing is something else; and that is what is now in the works. Meanwhile, McLouth is saying nothing, although the obvious deduction is that he plans to build docks, blast furnace, coke ovens and open hearths at his expansive downriver site. These facilities, plus a cold mill, will supplement the present four electric furnaces and hot strip mill. The electrics are now in process of being converted to top-charge design, two scheduled to be ready by the middle of August, the other two a month later.

Decision to invest in the conventional blast furnace and open-hearth steelmaking facilities is taken by some as ample proof that electrics cannot compete pricewise in a normal steel market; by others as nothing more than insurance against future contingencies on the part of McLouth. He may even be able to work out an arrangement where big Detroit-area customers like General Motors, Ford, Briggs, etc., will pick up the tab for the new installations—six in all—on a loan basis in exchange for steel priorities.

Chrysler Triples L.A. Plant

Chrysler Corp. is tripling the size of its Maywood plant in Los Angeles to make room for increased defense production in that area. Eventual use for the expanded facility will be an increase in the company's West Coast operations on its entire line of passenger cars.

GM Sales, Earnings Slip

Operations of General Motors during the second quarter of 1951 reflected the developing requirements of the national defense program, say C. E. Wilson, president, and Alfred P. Sloan Jr., chairman of the board.

Aggregate net sales of all GM products totaled $1921 million and net income was $139 million for the second quarter of 1951. For the second quarter last year, net sales were $1963 million and net income was $273 million. Total payrolls were $475 million in the second quarter and $957 million in the first half of 1951, compared with $455 million and $859 million respectively in the like periods of 1950.

The number of men and women working for GM during the second quarter of 1951 averaged 477,796, compared with an average of 492,046 in the preceding quarter and 463,861 during the second quarter of 1950.

Designed for making fast work of slow jobs

AUTOMATIC BAR AND CHUCKING MACHINES • PRECISION BORING MACHINES

LUCAS HORIZONTAL BORING DRILLING AND MILLING MACHINES

NEW BRITAIN

Automatics

THE NEW BRITAIN GRIDLEY MACHINE DIVISION
THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT

Shell Game with a New Twist...

SHARON* HIGH CARBON STRIP STEEL GOES INTO 20 MM. SHELL LINK

THE LINK represents one of those tough little problems of engineering. The part is needed in millions. The tolerances in manufacture are so exacting as to make it a precision production job.

Sharon High Carbon Strip, fed from coils, is being used regularly on this job. For this application a heat treatable spring steel with exceptionally good forming qualities is used. The use of strip aids high speed production. Big Sharon coils reduce down time too.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

DISTRICT SALES OFFICES: CHICAGO, ILL., CINCINNATI, O., CLEVELAND, O., DAYTON, O., DETROIT, MICH., INDIANAPOLIS, IND., MILWAUKEE, WIS., NEW YORK, N. Y., PHILADELPHIA, PENNA., ROCHESTER, N. Y., LOS ANGELES, CALIF., SAN FRANCISCO, CALIF., MONTREAL, QUE., TORONTO, ONT.

For information on Titanium Developments contact Mallory-Sharon Titanium Corp., Indianapolis 6.

SHARONSTEEL

The Business Trend

Index of industrial activity moves sideways as some segments of industry experience a slackening in business while others boom along at record pace

CURRENT ANSWER to that everyday question "How's business?" is that activity in the week ended July 28 was moving sideways at a level slightly below that for the corresponding time last year and that there were indications the sideways movement would give way in the week ended Aug. 4 to a decline.

Reflecting the week of July 28, STEEL's industrial production index registered a preliminary 213 per cent of the 1936-1939 average. Final figure for the week ended July 21 was also 213 per cent. Both of these weeks produced index figures that were slightly below those for the corresponding weeks of last year. The week ended July 28 was the third consecutive one in which STEEL's index was below that for the comparable period of 1950.

Slow-Down for Autos . . .

Much of the failure of the current index to measure up to that of last year is traceable to lowered production in the automobile industry. In the week ended July 28 the outturn of passenger cars and trucks in the United States and Canada totaled 131,462 units compared with 191,978 in the like period of last year, says *Ward's Automotive Reports*.

Production schedules for the week ended Aug. 4 indicated the poorest passenger car assembly week since December, 1949. Output was expected to drop to the 60,000-70,000 unit range, which is about two-thirds of the production during the preceding week. A drop this sharp could be expected to pull down the overall industrial production index for the week.

Steel scarcity, long a problem with the auto industry, can't be called the principal stumbling block to auto production now. The major producer of autos is reported to have a steel inventory for more than 30 days' production at current rates; this is said to be more tonnage than this producer has had on hand for over a year.

Main reasons for the projected cutback in auto output are lagging sales and labor difficulties; shortages of materials in some instances can be blamed too.

Big Business for Steel . . .

Although auto production is down, the demand for steel for other products and defense uses is keeping steel ingot production above rated capacity. Despite the heat and other seasonal influences which normally cut into steel production in the summer, steelmaking furnaces were scheduled to produce over 2 million tons of steel in the week ended Aug. 4. This, said the American Iron & Steel Institute, would mark the 22nd consecutive week in which steel output exceeded 2 million tons.

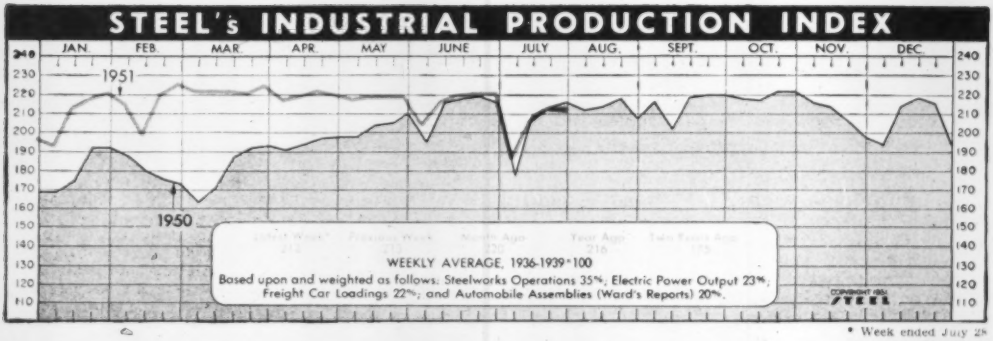
Output of steel for ingots and castings in the week ended Aug. 4 was scheduled to be 2,029,000 net tons, compared with 2,027,000 tons in the preceding week. In the like week a year ago, production was 1,919,600 tons.

Electrified . . .

Even though there are increasing signs of caution in business, the in-

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.5	101.5	103.0	98.5
	Electric Power Distributed (million kilowatt hours)	7,005	6,975	6,898	6,190
	Bituminous Coal Production (daily av.—1000 tons)	1,713	1,407	1,839	1,866
	Petroleum Production (daily av.—1000 bbl)	6,160	6,166	6,181	5,522
	Construction Volume (ENR—Unit $1,000,000)	$251.9	$361.1	$316.7	$252.5
	Automobile and Truck Output (Ward's number units)	131,462	131,419	156,105	191,978
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	810†	805	822	845
	Business Failures (Dun & Bradstreet, number)	184	133	188	160
	Currency in Circulation (in millions of dollars)‡	$27,706	$27,781	$27,601	$26,915
	Department Store Sales (changes from like wk. a yr. ago)‡	−22%	−10%	+6%	+46%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,998	$15,519	$16,610	$14,222
	Federal Gross Debt (billions)	$255.3	$255.0	$254.4	$257.4
	Bond Volume, NYSE (millions)	$15.6	$13.7	$14.4	$33.7
	Stocks Sales, NYSE (thousands of shares)	7,864	6,394	8,724	11,876
	Loans and Investments (billions)†	$70.1	$70.1	$70.4	$67.9
	United States Gov't. Obligations Held (millions)†	$30,739	$30,697	$31,186	$36,222
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.69
	STEEL's Nonferrous Metal Price Index‡	226.0	226.0	226.0	194.2
	All Commodities†	178.0	178.7	180.8	164.6
	Metals and Metal Products†	188.2	188.2	188.2	172.8
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
Compiled by STEEL

* Week ended July 28

dustrial activity level is still high enough that coupled with the trend of increasing use of electric power in industry, in the home and on the farm the consumption of electricity is again near the alltime high mark. Electricity output is from 12 to 13 per cent over that of this time last year.

Boon to the Coal Industry . . .

High production of electricity is expected to continue and bring about a record usage of coal by electric utilities this year. Furthermore, says the U. S. Department of the Interior, the rapid expansion of the electric power industry is expected to lead to a steady rise in the demand for coal for production of electricity in the next ten years. Electric utilities now account for about 20 per cent of total coal consumption, the department pointed out.

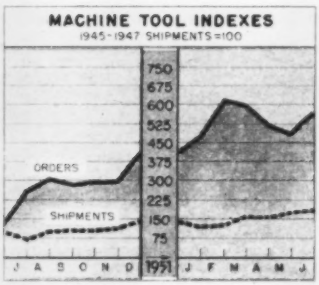
Bituminous coal production thus far this year is ahead of that for the comparable period of 1950. Output through July 21 was 286,387,000 tons, compared with 257,374,000 through July 22 of last year.

Coal production was back nearly to normal in the week ended July 21, when output was estimated at 10,280,000 net tons. In the preceding two weeks when most of the nation's miners were on vacation, output was off sharply.

Radio, TV Production Down . . .

Circumstances combined to reduce radio and television output in the second quarter of 1951 below that of the first quarter. But despite shortages of critical materials, increased government regulations and lowered demand for radio and television sets the total output in the first half of this year exceeded that of the like period of last year.

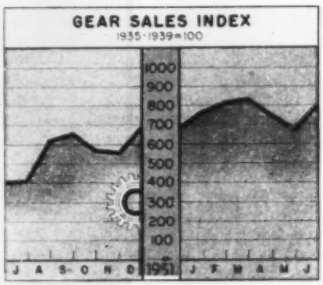
Second quarter production, reports the Radio-Television Manufacturers Association, was 3,792,338 radios and



Machine Tool Indexes

	New Orders		Shipments	
	1951	1950	1951	1950
Jan.	475.4	99.7	114.3	52.8
Feb.	615.5	89.2	123.8	56.1
Mar.	590.3	107.4	158.9	75.3
Apr.	516.1	98.9	157.7	61.6
May	483.0	116.4	175.1	82.5
June	567.0	124.1	183.5	91.9
July		253.1		68.3
Aug.		305.1		95.7
Sept.		280.6		101.6
Oct.		289.6		100.9
Nov.		291.9		110.9
Dec.		410.1		135.7

National Machine Tool Builders' Assn

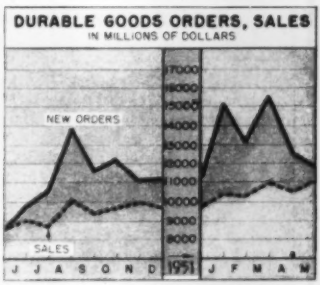


Gear Sales Index

1935—1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February	809.1	272.9	282.3
March	830.7	358.4	299.1
April	742.5	328.6	339.0
May	667.1	363.1	250.1
June	800.9	401.0	227.8
July		410.7	193.1
August		617.4	262.0
September		654.5	224.9
October		564.8	242.3
November		554.9	230.7
December		680.4	242.8

American Gear Mfrs. Association



Durable Goods Orders, Sales

In Millions of Dollars

	New Orders		Sales*	
	1951	1950	1951	1950
Jan.	15,123	7,479	10,398	6,817
Feb.	13,153	7,213	10,338	7,103
Mar.	15,478	8,508	10,993	7,643
Apr.	12,614	7,857	10,532	7,488
May	11,763	8,514	11,100	8,605
June		9,814		9,030
July		10,553		8,670
Aug.		13,563		10,060
Sept.		11,500		9,392
Oct.		12,171		9,671
Nov.		10,621		9,730
Dec.		11,379		9,794

* Seasonally adjusted. U. S. Office of Business Economics.

Charts—Copyright 1951, STEEL

1,134,836 TV sets, compared with 4,235,597 radios and 2,199,669 television sets in the first quarter. Produced in the first half of this year were 8,027,935 radios and 3,384,505 TV sets, compared with 7,333,600 radios and 3,136,300 TV sets in the first half of 1950.

A Fair Month . . .

Home laundry equipment manufacturers found that June was as good, and in some cases better, than May.

Factory sales of standard-size household washers in June totaled 253,119 units, compared with 253,942 in May, the American Home Laundry Manufacturers' Association reports. Sales of automatic dryers in June aggregated 39,908 units, compared with 32,292 in May, while sales of ironers in June totaled 24,500 units, compared with 24,200 in May.

Hard To Believe . . .

The government's wholesale price index declined for the eighth consecutive week in the week ended July 24, although it's hard to believe if you've just completed shopping for the week's supply of food.

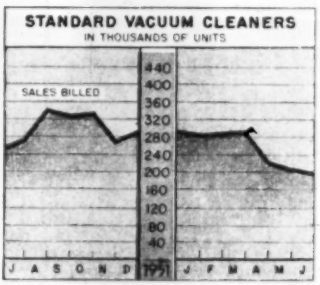
Index for the latest week was 178.0 per cent of the 1926 average. In the preceding week it was 178.7.

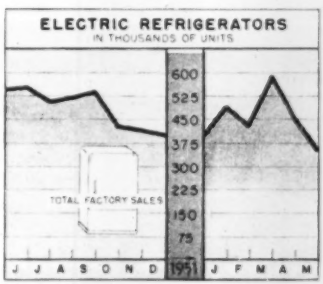
Trends Fore and Aft . . .

Continuing their climb, shipments of new equipment and repair parts by foundry equipment makers in June totaled $3,271,790. On the other hand, orders placed in June for new equipment dropped to $1,810,435, lowest level in over a year . . . Gear sales in June, 800.9 per cent of the 1935-1939 average, were the highest since March . . . General Refractories Co.'s shipments by volume in the first half of 1951 exceeded those of any previous six-months period . . . Order backlog and indicated schedules of Thompson Products Inc., Cleveland, make the company believe that 1951 will be its largest year and that substantially higher levels will be reached in the following two years. . . Business failures in June fell 7 per cent below those of May.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	July30	Gray Iron Castings	July9	Ranges, Elec.	July30
Employ., Metalwk.	July16	Indus. Production	July23	Ranges, Gas	July30
Employ., Steel	July23	Ironers	July16	Steel Castings	July9
Fab. Struc. Steel	July30	Malleable Castings	July9	Steel Forgings	July2
Foundry Equip.	July16	Prices	July23	Steel Shipments	July2
Freight Cars	July23	Pumps, New Orders	July9	Wages, Metalwkg.	June18
Furnaces, Indus.	July2	Purchasing Power	July23	Washers	July 16
Furnaces, W. Air	July30	Radio, TV	July16	Water Heaters	June25





Standard Vacuum Cleaners
Sales Billed—Units

	1951	1950	1949
Jan.	282,305	249,150	228,769
Feb.	261,572	263,515	241,267
Mar.	290,242	361,014	309,897
Apr.	227,216	292,664	252,656
May	201,983	278,645	222,850
June	194,548	250,190	207,354
July	.....	279,967	161,920
Aug.	.....	341,232	219,909
Sept.	.....	327,524	250,026
Oct.	.....	331,445	272,520
Nov.	.....	265,310	253,516
Dec.	.....	288,756	265,513
Total	.....	3,529,412	2,886,514

Vacuum Cleaner Mfrs. Assn.

Electric Refrigerators
Total Factory Sales—Units

	1951	1950	1949
Jan.	488,607	375,856	396,329
Feb.	423,420	461,256	348,539
Mar.	591,449	586,293	382,861
Apr.	445,636	546,279	335,092
May	348,423	542,865	341,933
June	.....	549,740	310,780
July	.....	507,029	327,429
Aug.	.....	518,359	314,839
Sept.	.....	535,002	326,149
Oct.	.....	420,431	265,575
Nov.	.....	411,201	230,258
Dec.	.....	394,268	272,636
Total	.....	5,848,579	3,852,420

National Electrical Mfrs. Assoc.

SAVE STOCKROOM TIME

Requisitions to your stockroom for Pheoll Fasteners can be filled in less time. Boxes, kegs and packages are plainly marked with sizes clearly indicated for rapid identification. Pheoll's quality products handle easily, can be quickly counted or transferred to bins or assembly line trucks.

REDUCE ASSEMBLY TIME

Workmen gain time assembling with Pheoll screws, bolts, and nuts because they are accurately threaded, drive easily, seat rapidly, grip tighter—assuring stronger assemblies, easier inspection and less rejects.

IMPROVE YOUR PRODUCT APPEARANCE

The uniform quality of Pheoll Fasteners improves your product appearance. Precision slotted and finished heads, cleanly chamfered nuts, prevent marred surfaces and add to your product's sales appeal. Write for Pheoll literature and price list.

Save Costs...Increase Profits with these Pheoll Fasteners

ASK ABOUT PHEOLL Machine Screws† Machine Bolts • Special Screws and Bolts Cap Screws • Machine Screw Nuts • Wood Screws† • Thumb Screws • Brass Washers Stove Bolts†

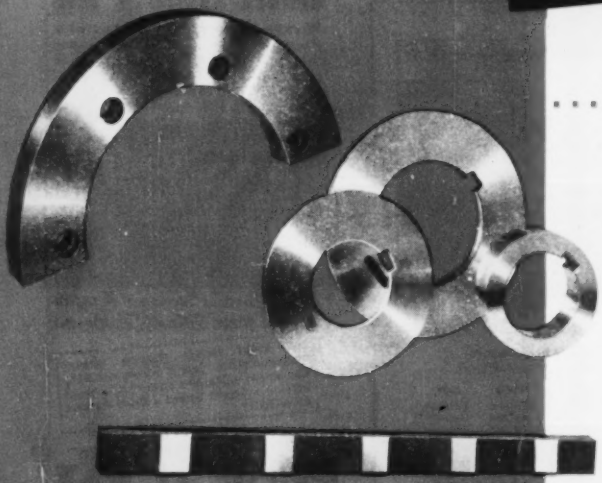
†Furnished in slotted and Phillips Recessed Head Types

Pheoll MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS
Industrial Fasteners and Holding Devices

. . . The Bowie Knife

Named for Colonel James Bowie of Alamo fame, this was the favorite knife of scouts and frontiersmen. With its rugged steel blade, from ten to fifteen inches long, the well-balanced Bowie Knife served equally well as a hunting knife or a combat weapon.

FAMOUS Blades



. . . Heppenstall Shear Knives

These clean-cutting knives have an enviable reputation for long service. They consistently deliver greater tonnage per edge at lower costs per knife.

To assure finest quality, each knife is made from our own electric induction steels (E.I.S.) . . . heat treated and tempered to do a better cutting job in specific applications. All the skill and experience gained in 62 years of knife manufacture are at your service when you call on Heppenstall to help solve your shearing problems.

Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

Heppenstall—*the most dependable name in forgings*

Men of Industry

G. A. PETERSON
. . . new president of Ferro Eng.

WALTER M. CHARMAN JR.
. . . Ferro Eng. exec. V. P.

Ferro Engineering Co., Cleveland, elected **G. A. Peterson** as president to succeed the late **Walter M. Charman. Walter M. Charman Jr.** was named executive vice president and **P. R. Ward** was elected a vice president. **A. C. Bishop**, who helped organize Ferro in 1929, and has been secretary as well as a member of the board of directors since the company was formed, was elected chairman of the board.

Perfect Circle Corp., Hagerstown, Ind., elected **W. B. Prosser** as a vice president. He was named general manager in 1947. He joined the organization in 1925 as a salesman for the General Piston Ring Co. in Tipton, Ind., where he later became plant manager.

Managers of **Cleveland Graphite Bronze Co.'s** new branch plants are: **John M. McKinley**, manager of the Caldwell, O., plant, and **Matthew J. Fleming Jr.**, manager at McConnelsville, O.

A. S. Cogan and **W. M. Bain** were appointed to the ammunition department, research and development division, **Olin Industries Inc.**, East Alton, Ill.

Edward P. Bullard III was appointed manager of the new **Pratt & Whitney Aircraft** plant at North Haven, Conn. The plant will manufacture engine parts for assembly in the main East Hartford plant of P&WA, division of United Aircraft Corp. Mr. Bullard for the last 18 years was associated with Bullard Co., Bridgeport, Conn., in the design and manufacture of machine tools. He was assistant general manager, vice president in charge of manufacturing and a director of the Bridgeport firm. More recently he designed special machinery for manufacturing jet engine components.

Robert R. Simons was elected vice president of **Sharonsteel Products Co. of Pennsylvania**, a warehouse subsidiary of Sharon Steel Corp., Sharon, Pa. He succeeds **T. J. Moore Jr.**, who will devote his entire time to **Brainard Steel Co.**, Warren, O., also a Sharon subsidiary.

W. J. Maurer was named general production manager of the six plants of **Detroit Steel Products Co.**, Detroit. Associated with the concern since 1936, he served on production in the Washington office and in sales engineering. Since 1945 he has carried out special assignments on manufacturing problems. He recently returned from England after two years' study of foreign galvanizing methods. **John E. Bloomstrom** was named director of industrial relations.

Thomas L. Hammond, a vice president of **Whiting Corp.**, Harvey, Ill., was elected to fill the existing vacancy on the board of directors.

Joseph Pargeter was appointed works manager of the new **Willys-Overland Co.** plant in Erie, Pa. The plant was the former Aluminum Forgings Co. **William Jakelsky** is assistant works manager of the unit which will begin operations by Sept. 1. **George Magill** will be purchasing agent.

Albert R. Pfeltz Jr. was appointed assistant manager of sales in **U. S. Steel Co.'s** Cincinnati district sales office. He was assistant to the manager of sales in the company's New York district office.

William B. Yeager has resigned from the positions of vice president, secretary-treasurer and member of the board of directors of **Menasco Mfg. Co.**, Burbank, Calif. **B. R. Fondren** was elected assistant secretary, assistant treasurer and director of the company's finance division.

L. Robert Vitkin, formerly plant manager of **American Flange & Mfg. Co.** in Chicago, was appointed vice president in charge of production of all company plants with headquarters in New York. **Richard L. Parish Jr.** was appointed vice president—sales.

Robert F. Hodgson was appointed sales manager, **Hydraulic Equipment Co.**, Cleveland. Associated with the company since 1945, he served in various capacities in both sales and engineering, more recently as chief engineer, in which position he will continue.

Clark A. Sutton was appointed plant manager, **Columbia Steel & Shafting Co.**, Pittsburgh. **J. Ross Maxwell** was made superintendent of the bar mill, and **Malcolm C. Hulse**, superintendent of the tubing mill.

Charles P. Betz was appointed general superintendent, blast furnace division, **Great Lakes Steel Corp.**, Ecorse, Mich., to succeed the late **E. J. McCleary**. Mr. Betz has been assistant manager of the division since 1940.

Frank P. Downey was named divisional vice president and general manager, Pinspotters Division, Buffalo, **American Machine & Foundry Co.**, New York. He is also vice president and director of sales of AMF Pinspotters Inc., company bowling products subsidiary.

Newly elected directors of **Revere Copper & Brass Inc.**, New York, are: **Simon D. Strauss**, vice president in charge of sales for American Smelting & Refining Co., and four Revere vice presidents, **Charles A. Macfie** and **J. Aylmer Doucett** of the New York executive offices, **Irving T. Ben-**

nett, head of the Baltimore division, and **James M. Kennedy,** in charge of the Rome Mfg. Co. Division.

George L. Stewart was appointed executive vice president of **Monarch Steel Co.,** Hammond, Ind. Before

GEORGE L. STEWART
Monarch Steel exec. V. P.

joining Monarch he was with Edgar T. Ward's Sons Co., division of Columbia Steel & Shafting Co.

Capt. Ellsworth E. Roth, USN, ret. has joined the Kalamazoo, Mich., works of **Ingersoll Products Division,** Borg-Warner Corp., as assistant to the works manager, defense division.

J. J. Nimtz, formerly of Allis-Chalmers Mfg. Co., was appointed to the newly created post of director of purchases of **Prentiss-Wabers Products Co.,** Wisconsin Rapids, Wis. **John Gruber** was named purchasing agent.

J. L. Brown, former general sales manager, was elected vice president, **American Vitrified Products Co.,** Cleveland. He continues in direct charge of sales in all company divisions. **E. L. Miller,** vice president and general manager, in addition becomes a member of the company's board of directors.

The Kansas City aircraft plant, now under construction for **Ford Division,** Chicago, Ford Motor Co., will be under direction of the division's defense production operations, of which **W. D. Singleton** is manager. Manager of the new plant will be **B. W. Rose,** until recently manager of the division's assembly plant in Memphis, Tenn., and **Ben D. Mills,** former division manager of production programming and control department, becomes assistant manager. Other appointments to the aircraft plant include: Controller, **M. R. Schermerhorn Jr.;** industrial relations manager, **M. P. Havstad;** purchasing agent, **William P. Boor;** and quality control manager, **James B. Holloway.**

James L. Womer was appointed sales engineer assigned to the Pittsburgh branch sales office of **National Radiator Co.,** Johnstown, Pa., to succeed **Charles F. Morrow** who retires after completing 43 years of service. Mr. Womer will cover western Pennsylvania, eastern Ohio and northern West Virginia.

R. J. Sigafoo was appointed chief engineer, **Twin Coach Co.,** Kent, O. He was formerly engineering assistant to the president and will combine those executive duties with responsibilities of his new post.

Integration of all engineering functions under a single direction was announced by **Automatic Transportation Co.,** Chicago, division of Yale &

B. I. ULINSKI
heads engineering at Automatic

Towne Mfg. Co. **B. I. Ulinski,** as director of engineering, is responsible for management of all engineering functions including research, product design, test engineering and special engineering services. He is succeeded as chief engineer of rider-type Automatic electric industrial trucks by **Ressler A. Dusseau,** formerly his assistant and also manager of engineering cost control.

Dr. L. D. Barrick was appointed manager and **R. M. Locke,** assistant manager of a new fine chemicals division organized by **Pittsburgh Coke & Chemical Co.,** Pittsburgh.

John J. Alexander was appointed superintendent of steam and power at **Republic Steel Corp.'s** Cleveland district to succeed **Harry Stott,** retired after 36 years in that position.

Heli-Coil Corp., Danbury, Conn., announces the departure of **Eugene M. Lang,** vice president in charge of manufacturing, to Japan to complete licensing arrangements and set up production of Heli-Coil thread inserts and tools in the plant of Tsugami Mfg. Co. Ltd. of Tokyo.

Denison Engineering Co., Columbus, O., appointed **Leonard J. Freeman** as district field engineer for the marketing area of eastern Iowa and northern Illinois with exception of the immediate vicinity of Chicago. Until recently he was associated with the Chicago office of the company as direct factory representative and field engineer in the Chicago area. For the present, he continues headquarters there.

Orvis L. Johnson on July 1 joined the staff of **Superior Steel & Malleable Castings Co.,** Benton Harbor, Mich., as superintendent of the machining and assembly division.

New West Coast manager of **Brainard Steel Co.,** Warren, O., is **Harry W. Hughes.** His office will be in San Francisco as of Aug. 15.

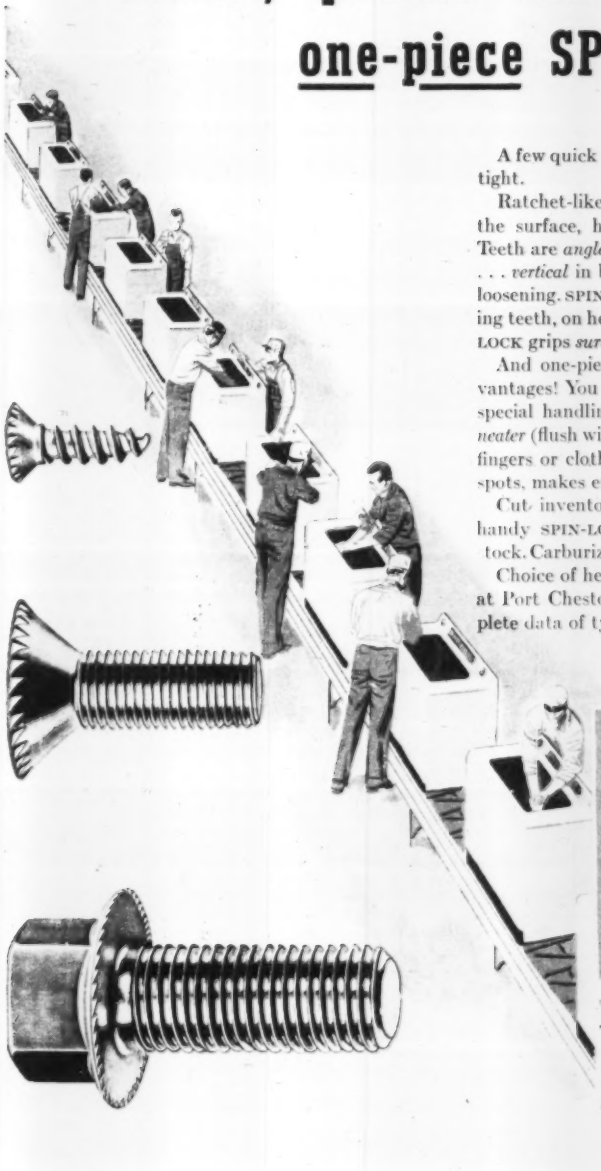
Vincent W. Scully was appointed comptroller, effective Sept. 1, of **Steel Co. of Canada Ltd.,** Toronto, to succeed **S. E. Lebrocq,** retiring after 45 years of service.

Mitchell A. Kapland, vice president, was placed in charge of sales activities for all four divisions of **Cummins-Chicago Corp.,** Chicago. He

MITCHELL A. KAPLAND
heads div. sales of Cummins

joined this organization in 1949 as general sales manager. In 1950 he was elected vice president of sales for its business machines division, and in 1951 became vice president of all four divisions of the corporation. **Robert E. Mitchell** was promoted to

Easier, speedier assembly with new one-piece SPIN-LOCK Screw!



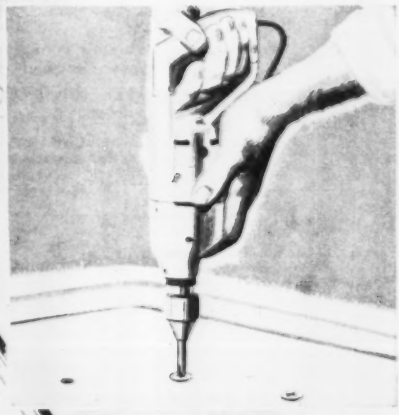
A few quick twists, and you're *sure* this fastener holds tight.

Ratchet-like teeth under SPIN-LOCK's head lock into the surface, hold tighter despite extreme vibration. Teeth are *angled* on advancing side for easy tightening . . . *vertical* in back to bite into the surface to prevent loosening. SPIN-LOCK grips *stronger* . . . due to more locking teeth, on head's *outer* edge for greater contact. SPIN-LOCK grips *surer* . . . no parts to cant or fall off.

And one-piece SPIN-LOCK gives scores of other advantages! You save time . . . no extra part to add, no special handling. It's easy to hopper-feed. It fastens *neater* (flush with surface), *safer* (no projections to catch fingers or clothes). It's easy to drive in hard-to-reach spots, makes excellent contact in electrical equipment.

Cut inventory and purchasing costs with RB&W's handy SPIN-LOCK Screw. Just one part to buy and stock. Carburized so teeth won't wear out despite re-use.

Choice of hex, pan, truss, or flat heads. Write RB&W at Port Chester for free SPIN-LOCK folder, with complete data of types and specifications.



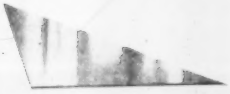
RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Dallas, Oakland. Sales agents at: Portland, Seattle.

RB&W THE COMPLETE QUALITY LINE

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

What you can do to make the supply of Stainless Steel go further



Make full use of the steel you get by keeping down scrap losses in your shop

Keep these points in mind, too, when you order Stainless

Tell your supplier exactly where you'll use Stainless and how you'll fabricate it.

Minimize scrap losses at the mill by ordering the exact sizes that you will use.

Indicate, if possible, acceptable alternates in composition, gage and finish.

Holding your own scrap losses to a minimum to make the fullest use of the steel you receive is good shop practice anytime. It's especially important today.

Here are a few suggestions that may help you stretch your supplies. See that they are followed. Add other rules that your operations may dictate.

1. **Lay out your jobs to use steel as economically as possible. Then order to the closest possible size.**
2. **Keep your stock of Stainless Steel carefully separated by grades.**
3. **In your storage areas, make sure that surface finishes are protected properly.**
4. **Lay down strict rules for careful fabrication and handling. It will help you reduce rejections.**

No matter how carefully these rules are followed, there'll always be a certain amount of scrap. To keep new steel flowing to you, get your scrap back into circulation as quickly as possible by *promptly* turning in every pound to the mills.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND · COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST TO COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-961

UNITED STATES STEEL

T. W. MERRILL
Vanadium's chief metallurgical eng.

HOWARD E. HORNICKEL
. . . Donora Zinc Works supt.

ALBERT L. WILLIAMS
. . . elected a director of IBM

field sales manager, Cummins Portable Tool Division.

T. W. Merrill was appointed chief metallurgical engineer of **Vanadium Corp. of America.** He transfers from the plant at Bridgeville, Pa., to executive offices in New York.

A. E. Carter was named manager, manufacturing department, **Dearborn Motors Corp.,** Birmingham, Mich. Prior to joining Dearborn he was works manager for a division of Motor Products Corp., and before that was with Kelvinator Division, Nash-Kelvinator Corp., for 20 years.

Lindberg Steel Treating Co. made the following new appointments at its Chicago plant: **E. J. Pavesic,** director of research; **N. O. Kates,** works metallurgist; and **F. J. Minch,** metallurgist.

Louis B. Vanderhorst was appointed sales manager of **Merz Engineering Inc.,** Indianapolis. He has been connected with the company as sales engineer for a number of years.

Howard E. Hornickel was named works superintendent of **American Steel & Wire Co.'s** Donora Zinc Works at Donora, Pa. He succeeds **M. M. Neale,** retired. Mr. Neale has been with Donora Zinc Works since its establishment in 1915 and works superintendent since 1946. Mr. Hornickel in 1948 was appointed assistant works superintendent.

Charles B. Cobun, for many years associated with United States Steel Co., has joined the Chicago district sales office of **Heppenstall Co.,** Pittsburgh forgings manufacturer. He will be assistant to J. C. Patton Jr., district representative.

Harry F. Fischer was appointed industrial sales manager for **Limbach Co.,** Pittsburgh. Mr. Fischer will coordinate the company's various production departments.

Brooks McCormick was appointed joint managing director of **International Harvester Co. of Great Britain Ltd.,** with headquarters in Doncaster, England.

International Business Machines Corp., New York, elected **Albert L. Williams** a director to succeed **John L. Barton,** resident manager at the Endicott, N. Y., plant, who retired Aug. 1 after 51 years' continuous service. Mr. Williams is vice president and treasurer.

William R. Heath succeeds **Nathan R. Johnson,** retired, as a director and factory manager, **Buffalo Forge Co.,** Buffalo, and assumes the new title of manufacturing director. Mr. Heath has been chief engineer since 1948. **John E. Gill** succeeds to that position. He was in charge of pressure blower and axial flow fan sales. **George P. Schivley** was promoted to plant manager after serving as plant superintendent since 1943.

Kenneth P. Bowen, vice president in charge of manufacturing at **Northrop Aircraft Inc.,** Hawthorne, Calif., was elected chairman of the manufacturing methods committee for the western region of the Aircraft Industries Committee.

OBITUARIES . . .

William C. Johnson, 49, executive vice president of **Allis-Chalmers Mfg. Co,** Milwaukee, died July 26. He was a member of the board of directors and also a member of the executive committee of the board. In addition Mr. Johnson served as chairman of the board of Canadian Allis-Chalmers Ltd. He had been associated with the company for the last 27 years.

Charles B. Cole, 62, president, **Tool Equipment Sales Co.,** Chicago, died July 23.

Morton O. Snediker, who retired ten years ago as chief engineer of **Powers Regulator Co.,** Chicago, died July 20. He was a pioneer in the automatic heat regulator industry.

Eugene L. Beisel, vice president, **Moto-Truc Co.,** Cleveland, died July 12.

Edgar Meyers, secretary-treasurer and a director of **Rockwell Mfg. Co.,** Pittsburgh, until his retirement last January, died July 23.

Oscar C. Roesen, 63, president of **Wood Newspaper Machinery Corp.,** New York, died July 28.

Daniel E. McCarthy, 45, production control manager, **Springfield Machine & Stamping Co.,** Detroit, died July 23.

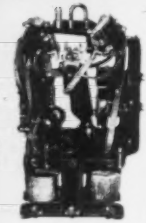
T. J. Mosher, 74, chairman of the board of **Mosher Steel Co.,** Dallas, died of a heart attack July 22 while on a business trip in Houston. He became president of the company in 1944, and chairman in 1948.

G. P. Dempler, engineer and president of **George P. Dempler Co.,** Pittsburgh, which he founded in the early 1920s, died July 28.

Herbert H. Foster, 47, general purchasing agent, **Lincoln-Mercury Division, Ford Motor Co.,** Detroit, died July 20 following a heart attack.

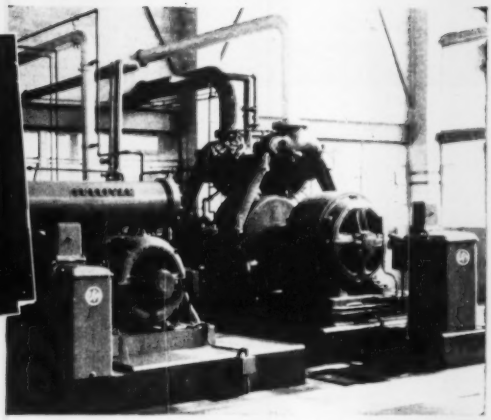
EC&M OIL-IMMERSED Motor Starters

A BIG AID TO PRODUCTION
OIL-IMMERSED FOR LOW MAINTENANCE

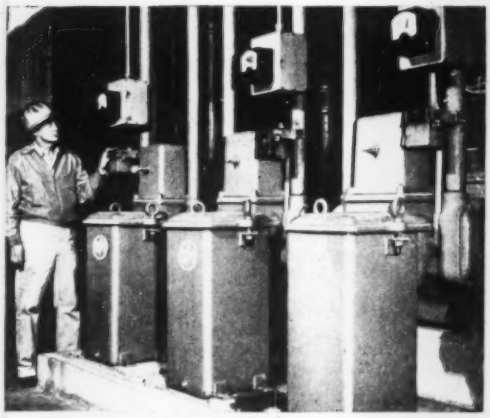


Compensator mechanism

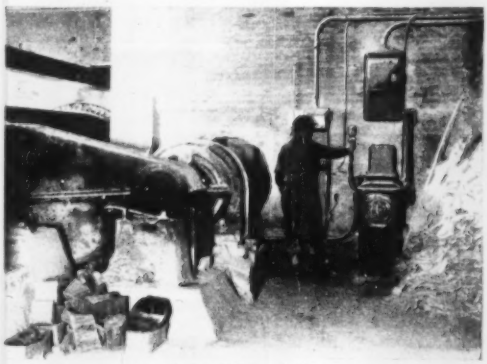
Complete compensator



Air Compressor Installation



For Grain Processing Machines



Grinding Mill Installation

Many industrial plants rely on EC&M autotransformer 220-550 volt Motor Starters for continuity of production. Oil-immersed, these starters are always well lubricated and protected from corrosion — *the need for frequent inspection or maintenance is eliminated.* Motor circuits are made and broken under oil — thoroughly safe, no dust hazards.

The compensator mechanism uses a simple, double-throw contactor requiring only one magnet coil — transition from reduced voltage starting to full voltage running is *automatic.* Squirrel-cage or synchronous motors are brought up to speed quickly, safely — with greater skill than human hands could do it.

Overload relays give inverse-time-element protection and also *trip instantly* on heavy over-currents. A magnetic balance in each relay absorbs heavy starting currents and allows a *low* current setting for accurate protection under running conditions.

Write for Bulletin 1045 and No. 19 ACCELERATOR Bulletin

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production and Engineering NEWS AT A GLANCE

BORON STEEL ARRIVALS—Two new series of boron-treated steels are being made available. One is the high-manganese type 14BXX, comprising three grades with 0.70-1.00 manganese in two carbon ranges, 0.35 and 0.55, and 1.20-1.55 manganese in the higher carbon, plus 0.20-0.35 silicon. The other is 50BXX, a chromium-manganese-silicon type made in ten carbon ranges from 0.15 to 0.60, with manganese running 0.70-1.00, silicon 0.20-0.35 and chromium either 0.25-0.40 or 0.35-0.60. All have minimum 0.0005 per cent boron.

CHASING LITTLE LEAKS—Faulty foundry or welding practice in the production of valves for nuclear reactors and atomic piles, resulting in leaky units, has been trimmed 25 per cent by use of a special detector in which a capillary tube emitting a helium tracer is moved over the surface of the valve. If a leak is present, helium will be drawn through it and inside the valve to a meter which registers its presence.

NI-MO-V FOR WELDING ARMOR—Investigation of 150 different compositions of low-alloy welding rod in a Navy-sponsored project to find a ferritic electrode which would weld low-alloy armor steels without either preheat or postheat and would develop 125,000 psi tensile strength in the weld, with maximum ductility, showed a nickel-molybdenum-vanadium composition meeting all requirements. Limiting figure for moisture content is 0.2 per cent for crack-free welds at this strength level. Weld cracking and porosity in low-alloy steels often are caused by hydrogen which may derive from the rod coating or moisture therein.

NAMES STICK—Self-adhesive metal nameplates of 0.003-inch aluminum foil, anodized and dyed, are available. No fastening devices are needed because of the high-tensile bonding material on the back. They are said to stick well to metals, porcelain, Bakelite, polystyrene, glass, wood, paints or enamels.

FATIGUE STRENGTH IS IT—Shot peening of the surfaces of stressed parts to improve service life by reducing the tendency toward failure from fatigue is a widely accepted commercial practice. The experts on stress analysis still toss the ball back and forth on such factors as type and size of shot, surface treatment prior to peening, etc. What it comes down to is how properly to express or measure the effectiveness of shot peening, acknowledging, of course, that it is effective. Expressed in terms of improvement in fatigue *strength*, not fatigue *life*, some interesting variations are observed. —p. 72

JET PARTS ARE TOUGH—Aircraft engine builders taking on production assignments in the field of turbojet power plants are bumping up against unique problems in machining. Alloys to be handled, particularly in parts like turbine wheel disks and blades, hot section castings and rings are often punishing on tools, while shapes of the parts are awkward for standard machine tool equipment. The answer was simply to develop new types of machines and to adapt tooling to the required precision. The veil is lifted on a few examples of how this is being done. —p. 76

SPRAY WITHOUT AIR—Electrostatic spraying of varnishes, enamels and lacquers on a variety of metal products is economical in terms of paint consumption, compared with conventional air-gun booth spraying, but there has still been some overspray. To correct this, comes a modification of the process in which the coating material is atomized and charged right in the spraying head, dispensing with the need for compressed air and spray booths. The "guns" have a cone-shaped spinning head which directs the liquid coating to parts passing by on a conveyor. Some engineers have wondered whether there may be trouble in store from clogging of these heads. Time will tell. —p. 80

SAVE THE SURFACE—Surface hardening of stainless steel may sound like gilding the lily, yet most types of stainless are relatively weak in terms of wear resistance. A modification of the nitriding treatment is being used to surface harden all the AISI 300, 400 and 500 types of stainless, the principal obstacle to its success having been the thin layer of chromium oxide on the surface which prevents formation of chromium nitride. This can be reduced with nascent hydrogen. In the process, maximum hardness is developed 0.002-inch below the surface. Conventional furnace equipment is used. —p. 82

PACKAGED DISTILLATION—Air separation plants of standard types and sizes, for production of liquid oxygen, nitrogen and gases such as technical argon on either a large or small scale are being offered by a British manufacturer. They are the first of their type to be built regularly in Great Britain. All feature simplicity, ease of erection and operation, low headroom and compact layout. —A.H.A.

Metalworking Outlook—p. 35 *Market Outlook—p. 153*

A More Realistic

SHOT PEENING

Fig. 1—Photomicrograph showing effect of shot peening on surface layers, depth of penetration being approximately 0.0014-inch. X1000 (From work of O. J. Horger and the author)

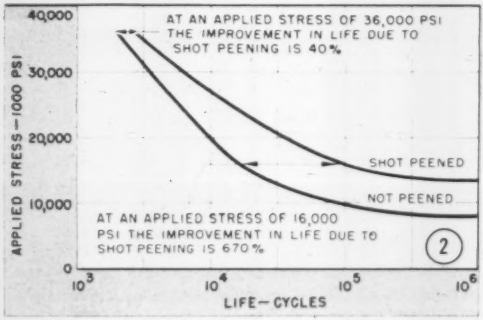
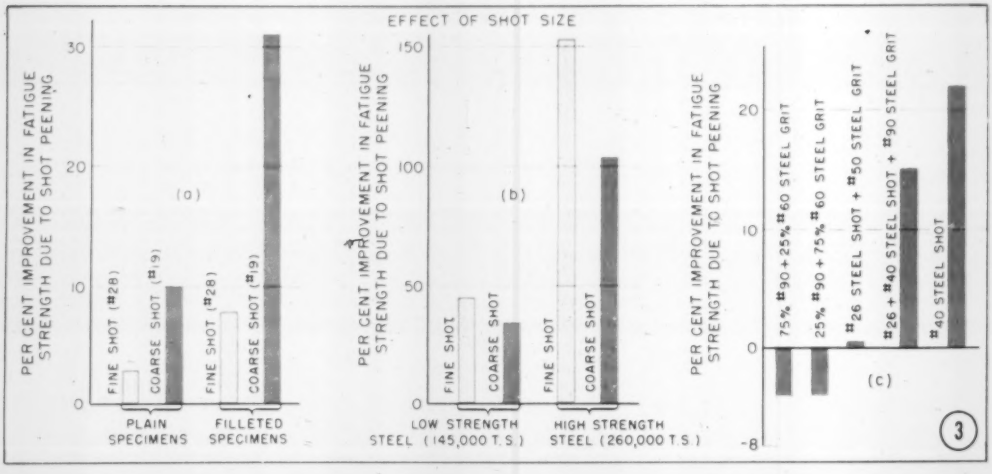


Fig. 2—A comparison between parts shot peened and not peened, in terms of their fatigue life, is meaningless unless the load or stress is specified

SPECTACULAR advantages of shot peening in improving the life of highly stressed machine parts have been recognized for a number of years. The work of F. P. Zimmerli, J. O. Almen, O. J. Horger, H. F. Moore and others has been featured prominently in the technical literature (see accompanying bibliography). It is a practical means for improving design, reducing weight and eliminating failures, which otherwise would have to be effected by an increase in section or a more expensive material.

Shot peening is a process of strengthening the surface of the part by blowing a stream of cast iron, steel or cut wire shot with an air blast or vanes of a rotating wheel. The strengthening is caused by compressive stresses set up in the surface layer and by changed shape and orientation of the crystalline grains. Fig. 1 shows the resultant microstructure.

As is true with any manufacturing process, shot peening has it advantages and limitations; only a clear understanding of its field of application will enable the designer and the metallurgist to take full advantage of its merits. In some applications shot peening can improve the strength of a part by as much as 250 per cent and useful life by 1500 per cent. In others no improvement can be realized.

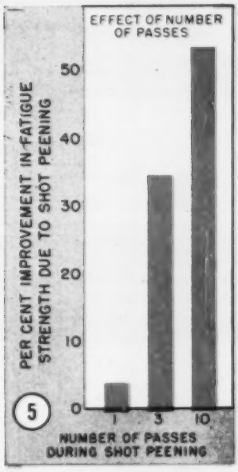


Measure of

EFFECTIVENESS

Fatigue strength, not fatigue life, is more logical yardstick to apply to determine improvement in performance of surface treated parts subject to fluctuating loads. Nine factors are evaluated on this basis

By CHARLES LIPSON
Consultant, Detroit



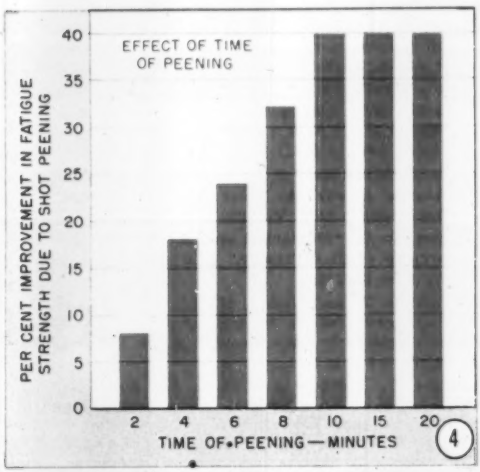
What, then, are the conditions which govern the field of usefulness of this process? In the first place, peening is effective only in those cases where the part is subjected in service to a fluctuating load, being completely ineffective for static loading. Since the former represents the vast majority of applications, the scope of shot peening is obviously vast. Other conditions to be recognized are the magnitude of service load, design of the part, tensile strength of material and condition of surface prior to peening.

These conditions are evaluated numerically in Figs. 3-11. Note that in each of these graphs, excepting Fig. 10, the effect of shot peening is expressed in terms of fatigue strength rather than fatigue life. This is the logical way of evaluating shot peening, as will be evident from a typical set of fatigue data shown in Fig. 2. The curves were derived by fatigue testing to destruction a number of shot peened parts, each at a different load, and duplicating the procedure for parts not peened. The curves drawn through the test points are known as S-N plots and they establish the fatigue strength of each part.

Observe that if shot peened and unpeened parts are compared at an applied stress of 36,000 psi, peening seems to improve life by 40 per cent. The same comparison at 16,000 psi gives a 670 per cent differential. Both 40 per cent and 670 per cent improvements are in themselves correct, except that if service stresses are raised to the order of 36,000 psi then 670 per cent becomes a totally fictitious figure.

This brings up the following point: If service loads are known a comparison in terms of life is valid. If not, parts should be compared in terms of load or stress. In the present case shot peening increases the load carrying capacity by 75 per cent.

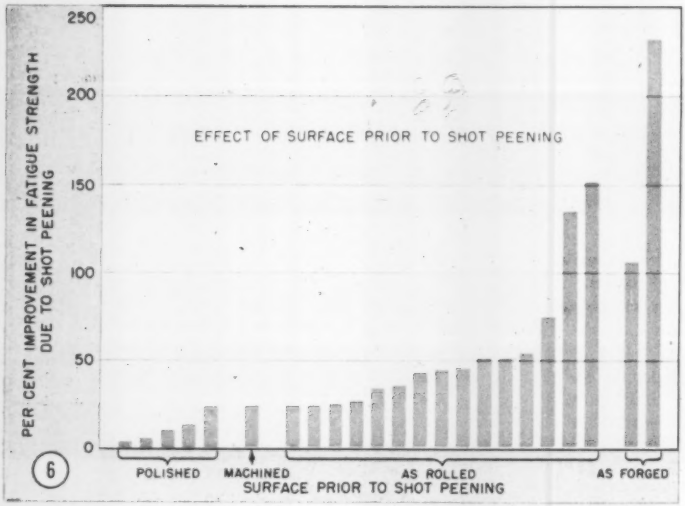
As a general rule it is better to express shot peening in terms of stress rather than life, particularly because service loads are seldom known. Furthermore, unless your part is an exact replica of the part already tested, the only way to use the available information in new designs is when the data are expressed in terms of stress. For this reason, out of a multitude of information available in literature or in report forms the author has selected only those data that are expressed in terms of fatigue stress. These data are plotted in Figs. 3-11. Each graph refers to a different condition governing the applicability of shot peening.

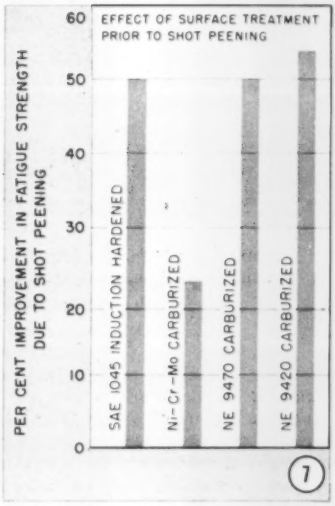


Shot Size—There seems to be no real agreement as to the effect of shot size on the fatigue strength (Fig. 3). Horger and Neifert in reporting test data of Lupfert show in some cases coarse shot to be better than fine and in other cases the opposite to be true. By mixing steel shot and steel grit Fry and Kehl have indicated various degrees of improvement. Horger and the author report no noticeable difference between various shot sizes in the case of automotive axle shafts.

Time of Peening—It is well established that in peening a saturation point is reached where any further treatment results in no additional improvement (excessive peening actually may weaken the part). This is shown in Fig. 4, based on the work of Zimmerli, where no particular benefit was obtained from peening beyond 10 minutes.

Number of Passes—This, of course, is related to the time of peening. Horger and Neifert have reported substantial improvement (Fig. 5) if ten passes





Coil springs on your car would not be taking the bumps the way they do were it not for the pioneering work of Almen, Zimmerli, Horger and Moore, the "four horsemen" of shot peening technology, and their laboratory cohorts.

are used instead of one. Data in Fig. 5 are derived for filleted specimens peened with 0.03115-inch diameter shot. Less consistent results were obtained with 0.055 and 0.080-inch shot.

Surface Prior to Peening—The quality of surface finish prior to peening is one of the most important factors in determining the degree of improvement obtained. If the original surface is good (say polished) shot peening will result in only minor improvement.

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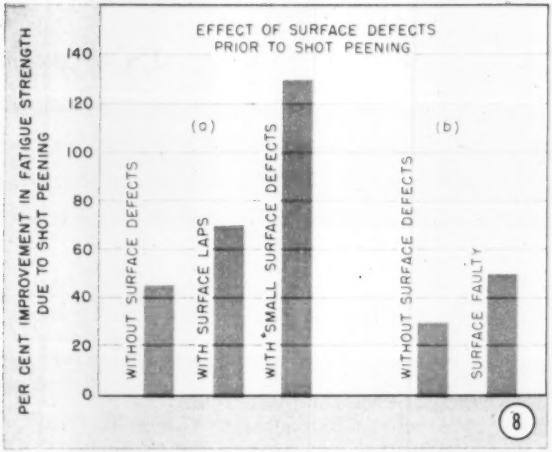
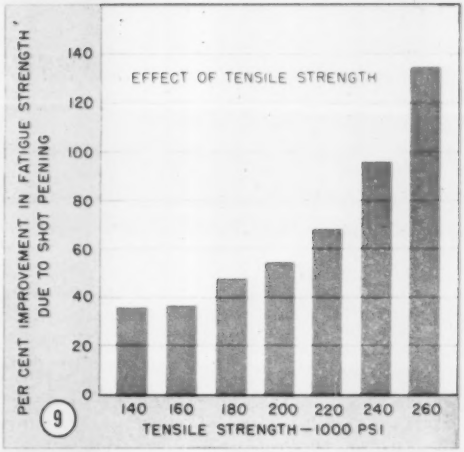




On the other hand, an as-received surface with forging pits and decarburization will show greatly increased strength. Thus, improvements ranging from 5 to 250 per cent may be obtained, depending on surface finish prior to peening. This is illustrated in Fig. 6, based on the work of many investigators.

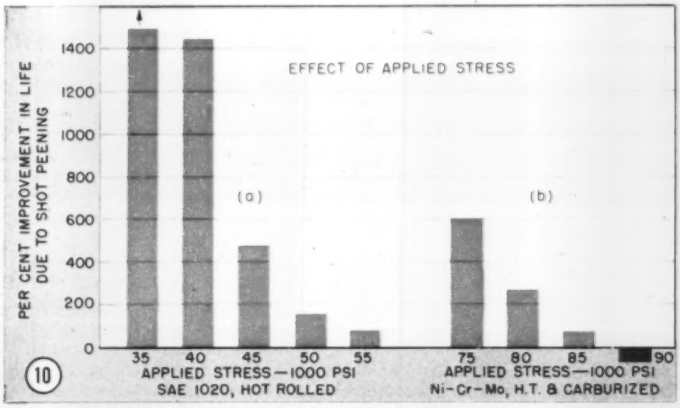
Surface Treatment Before Peening—There is little information available in literature on the dependence of peening on surface treatment. Fig. 7, based on the work of Moore, indicates that improvements up to 50 per cent may be anticipated.

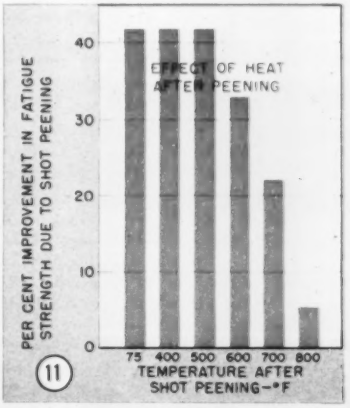
Surface Defects—Fig. 8 shows that a substantial increase in strength may result from peening parts having laps and other surface defects. Zimmerli, however, has stated that springs made from defective wire show no improvement from shot peening if seams or hairlines are present.

Tensile Strength—This is of considerable importance in utilizing peening for the whole range of steels, since tensile strength is approximately proportional to hardness. Data shown in Fig. 9 indicate that greater benefit is realized when peening is applied to high strength than low strength steels.

Applied Stress—Shot peening is beneficial in increasing the strength of parts subjected to fatigue loading and not effective if the load is static. Since fatigue phenomena cover the range of loads from the endurance limit up to the yield point greater improvement should be anticipated when the loads are low than if they are high. This is illustrated in Fig. 10 where in the case of a Ni-Cr-Mo steel a 600 per cent improvement in life is reported for the applied stress of 75,000 psi and actually a decrease in life when the stress was 90,000 psi.

Heat after Peening—The beneficial effect of shot peening can be minimized or evenly entirely obliterated if the peened part is heated. This is illustrated in Fig. 11 where the treshhold temperature is 500° F. Below 500° the beneficial effect of peening is retained. Above 500° the effect is diminished so that at 800° a shot peened part shows only a slightly higher strength than an untreated piece.





Revolutionary Machines and Tooling Are

Tough alloys, large diameters and thin wall sections have obsoleted former methods of aircraft engine building, putting machine builders to the test in meeting demands for precision and high production

MAJOR advances in tooling methods for volume production of axial-flow jet engines have been made as a result of a concentrated production-engineering program at Pratt & Whitney Aircraft, East Hartford, Conn. The project already has led to the development of several entirely new machine tools, through collaboration of P&WA and several machine builders, and has put into use some major improvements in metalworking techniques.

New designs of axial-flow gas-turbine engines of high power have posed fresh production problems not encountered in building reciprocal engines and the relatively more simple centrifugal-type turbojets. New tooling methods and new machines were needed to cope with these problems, which arose primarily from the need to work with much tougher materials and to produce a wide range of components of large diameter and thin wall section. Moreover, the rate of production asked for by the Air Force and Navy made obsolete many production methods that had formerly been acceptable for peacetime output.

Several of the new machines and methods can now be disclosed. They are all aimed at speeding up production through combining operations, increasing worker efficiency, and improving the quality of the finished parts.

New T-Bed Lathe Design—Machining thin-walled stainless steel rings of large diameter for turbojet nozzle vane rings, blade shrouds and tailpipes was one stickler. The diameters to be handled—running up to 48 inches—required a large lathe, capable of a 60-inch swing, a size normally built only for heavy-duty work. But the jet engine rings are shallow and of thin wall-section and the cuts to be made are relatively light and precise, so the large horsepower of the conventional heavy duty lathe was not actually needed. What was wanted was the range of a large car-wheel lathe with the sensitivity of a toolroom lathe.

P&WA took these requirements, together with a suggestion for lathe layout, to Lodge & Shipley, whose designers carried the idea onward. The result was an entirely new design: A right-angle chucking lathe with a T-shaped bed; that is, the section on which the carriage is mounted is at right angles to the center line of the lathe. The carriage carries a cross-slide which can move either parallel to the center line or at any angle to it. Hence, the new lathe can handle facing, straight or taper turning or boring, and can be purchased with a contouring attachment.

Five of these new T-bed lathes have already been installed and Lodge & Shipley is now supplying them to other industries. As a second-operation machine to receive roughed-out work from a vertical boring mill, it appears to be one answer to the current shortage of vertical boring mills.

The lathe uses a standard 25-inch heavy-duty headstock with an $11\frac{1}{2}$-inch hole. This permits chucking pieces with a shaft or other extension. Most parts, however, are simply clamped to the large faceplate—a 54-inch diameter aluminum casting, 5 inches thick, which has a low moment of inertia for easier starting and stopping. The work is held to this faceplate by means of mild steel straps and rods, located in the $\frac{3}{4}$-inch holes drilled in the plate, or by chuck jaws bolted to the aluminum plate.

Highly sensitive controls permit tolerances of up to 0.001-inch. All operations are controlled from the apron, including selection from 25 spindle speeds (ranging from 4 to 225 rpm) and from 55 feed speeds for the carriage and compound rest (from 0.001 to 0.0064-inch per revolution).

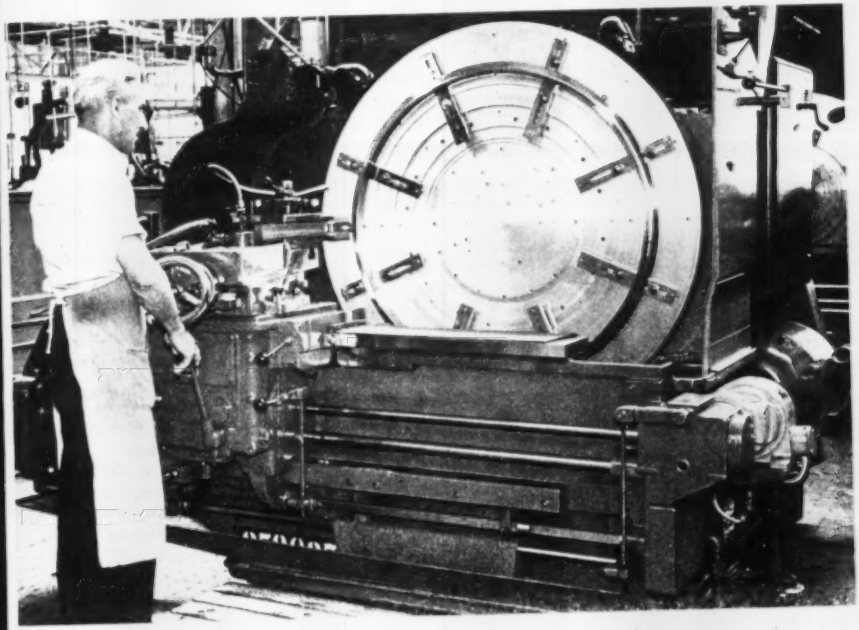
The lathe is much easier to load and unload than standard types, since there is not the usual long bed extending beyond the workpiece. Furthermore, the operator can stand much closer to the work, making it easier for him to follow the progress of the cutting and to make precise measurements of the work as it progresses.

The design saves nearly half the floor space that would have been required by a standard 60-inch swing lathe. Further, it costs several thousand dollars less than comparable 60-inch lathes on the market.

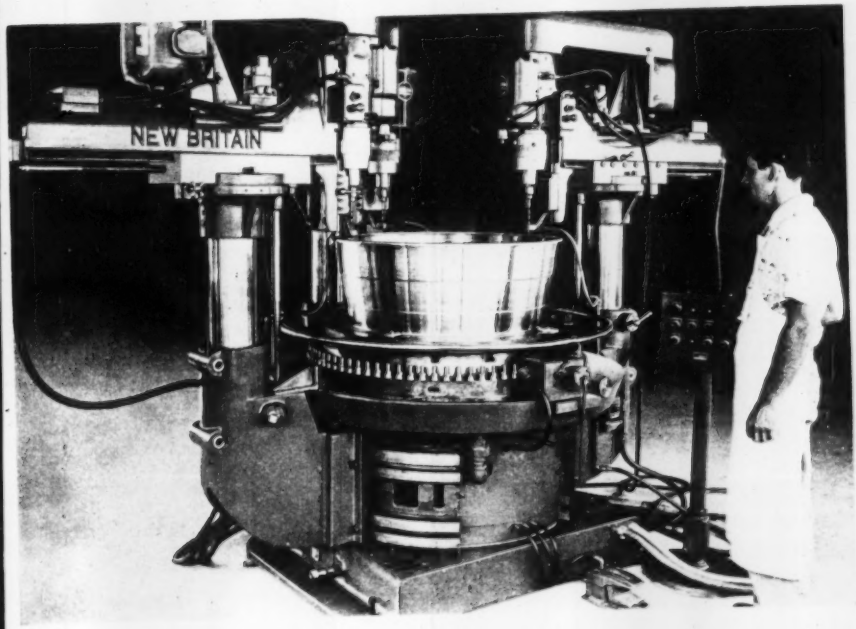
Three-Head Flexible Drilling Machine—Axial-flow gas turbines are assembled from a number of circular elements, bolted together. Because of this, the engine builder is called upon to execute a large variety of drilling patterns, spread over diameters ranging up to 48 inches, and in some cases providing as many as 196 holes.

Multispindle drilling machines clearly were not practicable for this work, for several reasons. The volume of production did not warrant the outlay for such specialized machines, capable of handling the whole range of patterns. Even if it did, a multispindle machine would not have been practical because of the time that would be lost changing drills. Most of the components are stainless steel, and the number of holes drilled between sharpenings is low, in stainless, as compared with low-carbon steel. Furthermore, no standard drilling machine was flexible enough to deal with the

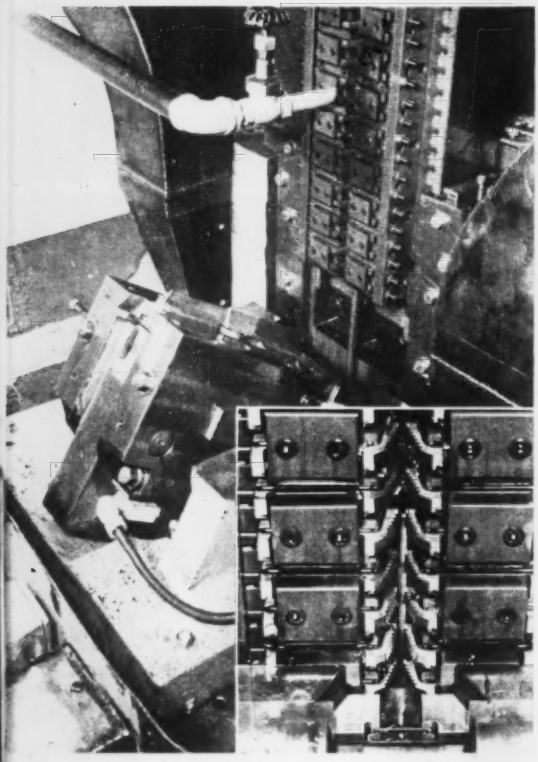
Devised to Finish Jet Engine Components



Right-angle chucking lathe with a T-shaped bed was developed to machine large diameter stainless steel rings. It combines a 60-inch swing with sensitivity of a toolroom lathe; also permits operator to stand close to work



This three-head adjustable spindle circular type drilling machine was designed to give greater flexibility than a multispindle unit. Large parts like this compressor casing can be drilled, reamed and countersunk or counterbored or tapped in one setup



In broaching the fir-tree roots of turbine blades, broaching and grinding have supplanted milling. The 15-ton 90-inch vertical broach has individual teeth, as shown in the inset, permitting finer adjustment and harder teeth which may eventually be carbide tipped. Blade, with root section unformed, is placed in holder, tipped forward for broaching

wide variety of hole patterns required. The cost of making drill jigs for these numerous large rings would have been a major expense item.

To overcome this situation, engineers conceived a solution which New Britain Machine Co. then executed: A three-head adjustable spindle circular type drilling machine, capable of handling any drilling pattern called for, without the need for expensive drill jigs and fixtures. The machine can drill, ream and countersink at one setup of the part, with only one tool in each spindle. In some cases it can handle two different components at one time. A fourth spindle soon will be added to the design.

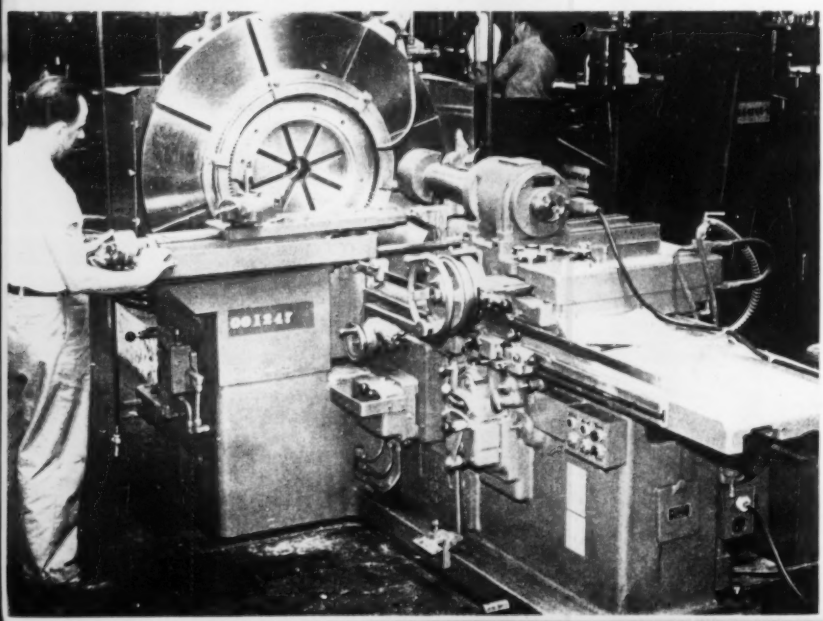
The machine is, in effect, universally tooled. All that is required is a locating diameter and a checking ring, to make sure the operator puts in all the holes required. Changeover from one hole pattern to another is a matter of a few minutes. Conservatively, this saving in drill jigs can be figured at more than $1000 per jig.

With the new machine, the operator can easily see that the drills are kept sharp so that they are worked to their fullest capacity, yet changed quickly as soon as they become dulled.

Free-Wheeling Table—The 46-inch diameter table is mounted on a large spindle with two independent radial ball bearings, the outer bearings supporting the table nearly to the outer edge. As a result, the table can be rotated with the lightest touch of a finger; a large handwheel is fitted for the convenience of the operator. The table is locked in working position for a particular drilling operation by means of a shot bolt (front center) operated by an air cylinder.

The three drilling spindle supports can be moved about the circular base through approximately 300 degrees of the perimeter, sliding on the two steel guideways, so that the spindles can be located at any desired points.

By swiveling the heads on their respective supporting columns, and by running the radial arms in or



To machine parts like this large, thin nozzle guide vane assembly, the turning slide from an engine lathe was "grafted" onto the bed of a large internal grinder, permitting light cuts such as recessing and chamfering after grinding

out in the holding brackets, any desired setting can be obtained. A single control pedestal contains the start-stop and feed and retract switches for all three spindles. Changeover from one hole pattern to another can be made in a matter of 15 or 20 minutes, providing the multiple falls within the range of the index pins which can be plainly seen around the perimeter of the table. These index pins are initially spaced by means of ground circular disks of equal diameter, to give the correct chordal distance for the required number of holes. When odd locations are needed, the location of the index pin is determined by V-links.

Operation of the machine is simple. To rotate the table from one locating pin to the next, the operator merely retracts the shot bolt by stepping on the foot-treadle (front, low down) which trips the air valve, then moves the table to the new location, stopping at the approximate center of the next index pin. He then releases the shot bolt which thereupon moves in slowly to engage the locating pin without jarring the table or unduly straining the pin.

The machine was designed to drill and ream to within 0.005-inch of the true location; in checking it out, the machine has performed to within 0.002-inch, or well within the accuracy desired for these circles.

Future development of this machine calls for the incorporation of a horizontal drill head and also for a broaching spindle for certain key holes whose angular location must be kept extremely exact but which must have clearance to allow for high temperatures radially. These slightly elongated holes can then be broached at the same time without removing the part from the table.

Broaching Fir-Tree Blade Roots—Advanced broaching methods have materialized in revising procedures for broaching the fir-tree roots of turbine blades. One of these is in forming both sides of the blade root at one pass; another is in the introduction of individual teeth in the broach, rather than using multitooth sections. Both serve to increase the rate of production and at the same time increase the life of cutting tools.

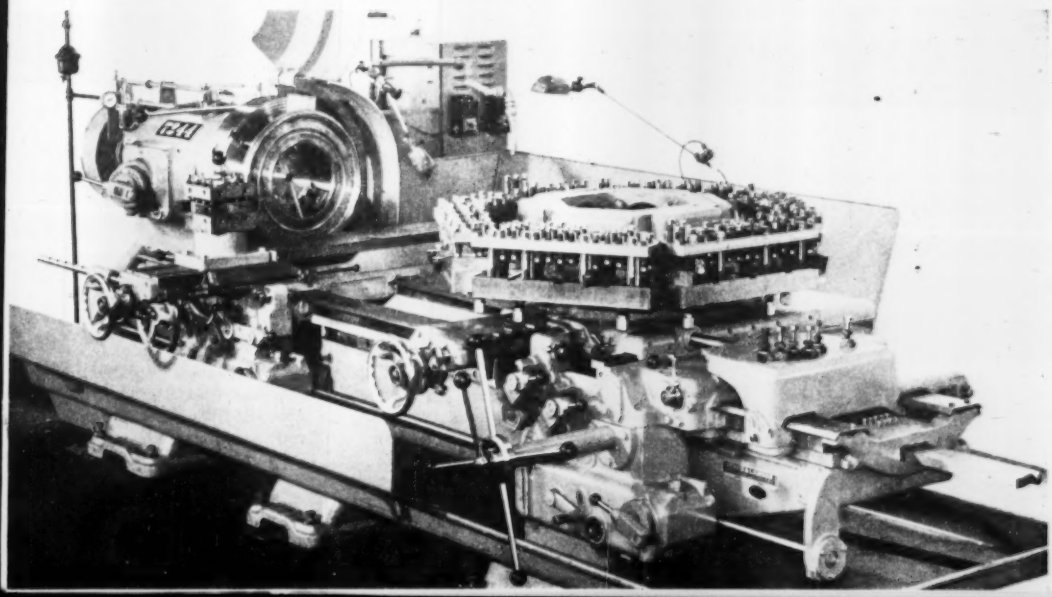
Previous method of machining these roots was to mill the "limbs" on one side of the "tree", then index the part and mill the limbs on the other side, using the same cutter. This gave neither the extreme accuracy required for these surfaces nor a low enough production time. So tool engineers have gone to a broaching-and-grinding operation which gives the gage-like accuracy of finish that it is necessary for the blades, and at the same time is less costly.

Broaching of both sides of the root at one pass is now carried out on a Lapointe 15-ton 90-inch vertical broach. Setup differs from the usual broaching practice in that each individual tooth in the body is separate, rather than having a number of teeth in one section.

The conventional multitooth setup imposed certain limits on the operation. You could not back off or relieve the teeth to adjust the amount of cut, because the teeth were so closely spaced. This can now be done. You could not make the multiple-tooth section as hard as the individual teeth can now be made. It has always required a high degree of skill to prepare broach sections with multi-teeth. Now the desired accuracy is obtained through controlling the forming of the grinding wheels which dress the broach teeth.

Changed Concept of Cutting—This setup represents another departure from usual broaching practice in breaking away from the old idea that several teeth should be in the cut at one time. This idea is obsolete, say Pratt & Whitney Aircraft tool engineers, because today's machines are so constructed that the ram guides give firm control over alignment of the stroke, and the teeth can be used for their primary function—cutting. With (*Please turn to Page* 100)

Extra rigidity, reminiscent of the Harkness lathe design of 35 years ago, is built into this turret lathe for machining the tough alloy steel disks for compressors and turbines of jet engines. Several tools operate at once, and the turret can carry all tools for machining both sides of two sizes of disks



Electrostatic Atomization Applied to Paint Spraying

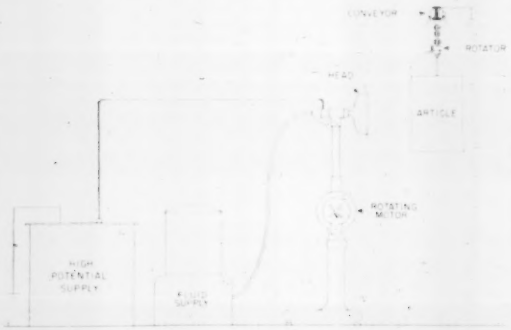
Liquid particles are charged and dispersed by new type of spinning head, requiring no compressed air. "Mileage per gallon" improved

LATEST concept of the electrospray process for applying lacquers, enamels and varnishes to metal products is based on electrostatic atomization of the coating material before it leaves the spray head. This is a complete departure from former methods of electrospraying in which air atomization was used and the atomized coating particles given a high-potential charge as they passed from the conventional air-spray gun to the part.

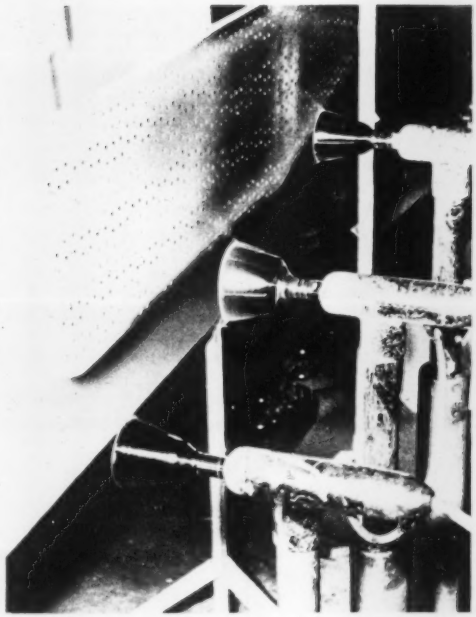
The new atomization principle was demonstrated July 26 at the plant of the Ransburg Electro-Coating Corp., Indianapolis, formerly the Harper J. Ransburg Co., and originator of processes for electrostatic detearing and spray painting. Numerous industrial applications of the latter processes have been made, some of which were described in STEEL for Aug. 9, 1943; Feb. 7, 1944; Nov. 12, 1945; May 12, 1947; and Sept. 26, 1949.

Current evolution of the method is known as the No. 2 process and a limited number of installations has been made, including those at Barler Metal Products Ind., Goshen, Ind.; Interstate Metal Products Inc., Michigan City, Ind.; Seymour Tool & Engineering Co. Inc., Seymour, Ind.; Geuder, Paeschke & Frey Co., Milwaukee; and Butler Mfg. Co., Galesburg, Ill.

Paint Metered to Head—In the No. 2 process, the article to be coated is carried by a conveyor past a modified type of spray "gun"—essentially a hollow cone-shaped head. Coating material is metered at a constant rate to the apex of the head and power rotation of the head spreads the material uniformly over its inner surface, causing an even flow to the outer edge.



Schematic arrangement of basic elements in latest type of electrospray system for applying lacquers, enamels or varnishes to conveyorized parts



Metal ironing boards here are carried horizontally on a conveyor at a speed of 17 feet per minute past atomizing heads directing enamel spray

A source of electrostatic high potential, having one terminal grounded and the other connected to the head, creates a strong electrostatic field between the head and the part to be painted which is grounded by the conveyor. The force of this field transforms the liquid coating into a spray of fine, charged particles and creates an attraction that pulls the particles to the grounded piece. This is calculated to effect nearly complete electrostatic deposition.

Major variables, such as atomization air pressure, spray pattern, fluid delivery and overspray exhaust air currents are eliminated. No spray booth is needed, no compressed air; only ventilation of the area for control of solvent vapor. When the shape of the part or the conveyor system do not permit complete deposition, a backboard is used as a simulated article. The virtual elimination of overspray naturally means more paint "mileage per gallon". In one installation where white enamel is applied to both sides of metal ironing boards, paint cost per board was reduced 25 per cent over the former electrospray process using air atomization.

Ransburg plans to supply the complete automatic coating unit, comprising the source of electrostatic potential, electrical controls, insulators, atomizing heads and the coating material handling system. Conveyors, workholders and ventilation are up to the user. The system operates from 220-volt, 60-cycle, single-phase power supply.

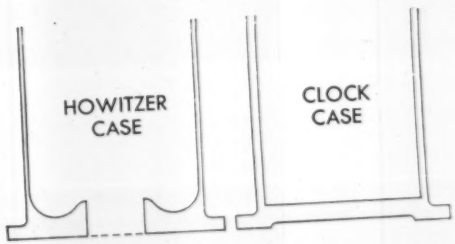
Chelsea Ship's Bell Clock, The Vanderbilt model, made by Chelsea Clock Co., Chelsea 50, Mass. Case drawn in one piece out of commercial brass by Worcester Pressed Steel Co., Worcester 6, Mass.

War Baby grows into a Clock Case

During the War, the Worcester Pressed Steel Co. worked out a technique for forming 4.5 howitzer shell cases of cartridge brass. The case was 3¾" high, 4¾" o.d., with thin walls and thick base that included a difficult flange, the material for which had to flow entirely from the base of the cup. The successful solution of the many problems required careful tool design, plus skilled control of each operation.

Later the Chelsea Clock Co. asked Worcester if it could cold-form clock cases out of commercial brass. A study of the clock case revealed striking similarities between it and the howitzer case, but on the other hand there was one important difference. The large radius on the inside of the howitzer case was not permissible in the clock case, because of the space required for the works. It was found that the bottom design could be achieved by squaring the case to the exact height, providing the bottom knockout with exactly the correct amount of spring tension in the restrike, and carefully governing the pressure and speed of press travel. The complete coordination of these factors resulted in a perfect case, and another example of the adaptation of war-learned skills to peace-time products.

• If you have problems in connection with the fabrication of copper and its alloys, or aluminum alloys, remember that the Revere Technical Advisory Service often can be helpful.



Cross sections showing similarities and differences between the howitzer case and the clock case.

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NITRIDING STAINLESS STEELS

for Better Wear Resistance

Cycle of 40 hours at 1000 °F in dissociated and ionized ammonia, following heat treatment, removes oxide layer by nascent hydrogen and is adaptable to conventional furnace equipment

By SIDNEY LOW
Supervising Engineer, Research and Development Laboratory
Chapman Valve Mfg. Co., Indian Orchard, Mass.

POOR wear resistance, with a marked tendency to seize and gall, is a characteristic shared by most of the stainless steels. The austenitic and ferritic types have the poorest wear resistance, although the martensitic and precipitation hardening types are usually also unsatisfactory in applications involving wear with high unit bearing loads, due to seizing and galling.

The Malcomizing[1] process was developed by Chapman Valve to overcome this inherent lack of wear resistance of the stainless steels. It is essentially a patented surface hardening process for producing an extremely hard, wear resistant case on stainless steel.

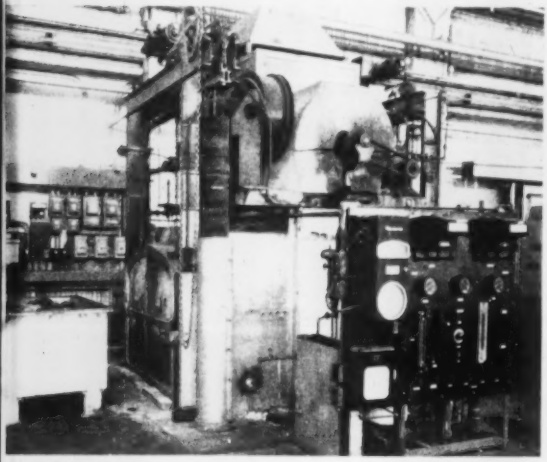
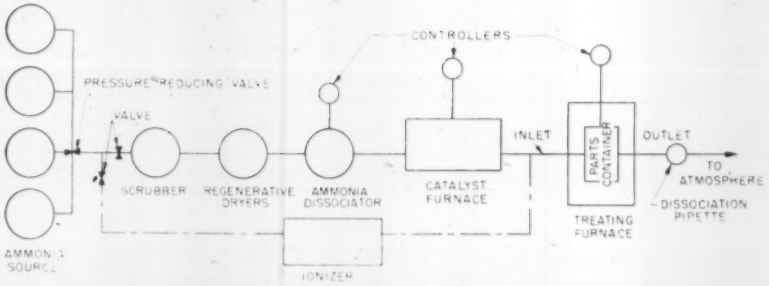


Fig. 1 (above)—Commercial installation, using a propane fired circulating type of furnace handling 6000-pound loads

Fig. 2 (right) — Schematic diagram of equipment installation for nitriding of stainless steel by Malcomizing process



Oxide Layer Is Problem—During the past several decades, many investigators have attempted to nitride the stainless steels, using both standard and special techniques. The thin layer of chromium oxide which forms on the surface of all stainless steels partially or completely prevented the formation of chromium nitride. Many expedients have been tried to reduce this thin layer of chromium oxide, including pickling in a reducing acid, prior to nitriding. Unfortunately, none of the methods evolved was particularly successful until the Malcomizing process was developed, making use of nascent hydrogen to reduce the thin layer of chromium oxide.

Fig. 2 diagrammatically illustrates the components of an installation. Fig. 1 illustrates a commercial installation, using a propane fired, circulating type of furnace. This particular installation will process up to 6000 pounds of work per heat.

The process will surface harden all the stainless steels, including the AISI type 300, 400 and 500 series, and the newer precipitation hardening types. The process is also applicable to the conventional nitriding grades of steel and the low-alloy structural grades. It will not surface harden nickel and/or cobalt base alloys.

No special furnace equipment is required. Any heat treating furnace, capable of fairly close temperature control in the range 800-1200° F is suitable. Furnaces ranging from small, electrically heated, laboratory muffle furnaces, to large, oil fired, car-

[1]Copyrighted, Chapman Valve Mfg. Co.

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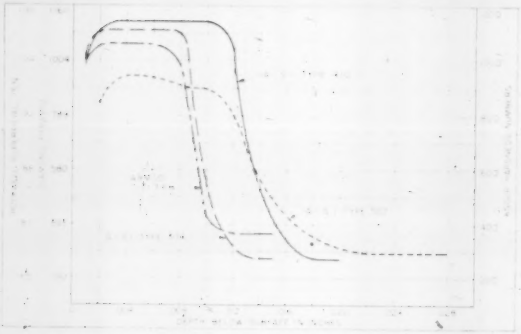

Fig. 3—Typical case hardness versus depth surveys for four types of stainless steel

type foundry furnaces, have been successfully used. Special nitriding furnaces, of the bell type, have certain advantages; as do gas fired, double end, circulating draw furnaces. The main advantages associated with these types of furnaces are convenience, ease in charging and unloading, and shortening of the total time cycle, due to increased heating and cooling rates.

Prior Heat Treatment Essential—One important feature, common to both nitriding the conventional nitriding grades of steel, and the stainless steels, cannot be overemphasized: The need of a proper heat treatment prior to surface hardening. It is well known that the conventional nitriding steels should be heat treated in a manner that produces a sorbitic, stress-free structure prior to nitriding. A similar, special heat treatment is also required for the heat treatable grades of the AISI type 400 series stainless steels prior to Malcomizing. The nonheat treatable grades of AISI type 400 series and the austenitc stainless steels are usually annealed prior to nitriding.

A suitable schedule of machining, cold working, welding and the like should also be set up to permit a final heat treating operation to remove all residual

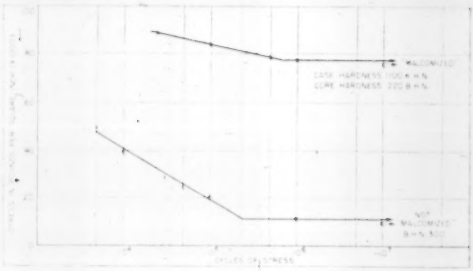

Fig. 4—Fatigue test on treated and untreated notched bar of AISI type 410 stainless, specimens polished with 000 emery

stresses prior to nitriding. If high residual stresses are not removed, distortion and/or strain blemishes may result.

There is no limit to the size of pieces which can be treated, other than the limitations of existing equipment. Pieces ranging in weight from a gram to several tons have been successfully handled. "Stopping-off" any areas not to be surface hardened is readily accomplished by coating with a special liquid applied by spraying, brushing or dipping.

No special surface finishes are required; however, all surfaces must be prepared by fine sandblasting. The minute roughening of the surface which results from this sandblasting operation may be removed by a light grinding or lapping operation after nitriding.

Ammonia Dissociated, Ionized—Properly prepared pieces are packed into a suitable pressure-tight retort, designed to permit the free circulation of gas around the pieces. The packed retort is placed in the furnace, gas inlets and outlets connected, and the flow of gas started. The special control panel, shown in Fig. 1, supplies properly dissociated and ionized ammonia gas to the retort. The total length of the cycle is approximately 40 hours, after the furnace and charge are brought to temperature of approximately 1000 F.

After treating, the pieces are clean and silvery-gray in color. Most applications require a final light grinding, lapping, honing, or polishing operation. The normal recommended finish allowance is approximately 0.002-inch per side. Properly heat treated work will not distort, although a slight growth occurs.

Fig. 3 illustrates typical case hardness versus depth surveys for several Malcomized stainless steels. It may be noted that these steels reach their maximum hardness approximately 0.002-inch below the surface. To some extent, the case has a lesser resistance to corrosion than the base metal. This is particularly true in the case of mineral acids, their salts and strongly oxidizing acids.

The corrosion resistance of treated stainless steel

Fig. 5—Group of stainless steel parts which have been given the nitriding treatment, showing range of sizes and shapes which may be processed

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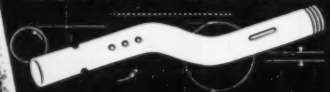

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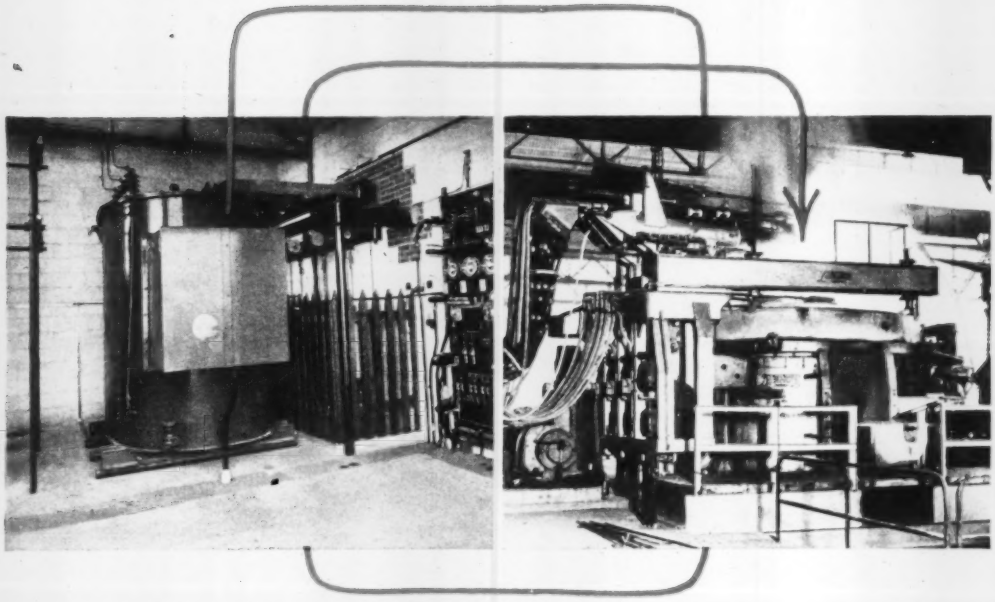

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WHEN YOU MELT... MOORE RAPID *Lectromelt*

is strongly influenced by surface cleanliness as is the corrosion resistance of all stainless steels. Passivation, using mild oxidizing solutions, such as sodium dichromate, will remove any free iron from the surface and appreciably enhance its corrosion resistance to many media.

Fatigue Life Improved—Although the chief advantage of nitrided stainless steel is its superior wear resistance an appreciable improvement in fatigue strength of stainless steel will also be obtained. The case has high residual compressive stresses, which act to improve fatigue life in the same manner as shot peening. Fig. 4 illustrates the effect of Malcomizing on the strength of notched AISI type 410 stainless steel.

The elevated temperature stability of the treated stainless steel is high. Although the actual operation is performed at approximately 1000° F, the reaction is not readily reversible. Laboratory tests indicated heating hardened AISI type 304 for 100,000 hours (approximately 12 years) at 1025° F will reduce its hardness by only about 50 per cent. Heating at lower temperatures has appreciably less effect. Treated stainless steels have excellent wear resistance at temperatures up to 1200° F.

No Sharp Corners—Consideration should be given the design of stainless steel parts to be processed. In general, two rules apply: Avoid sharp corners and hold unit bearing pressures below the yield strength of the base material. Sharp corners are liable to break if the piece is handled roughly and result in increased corrosion rates, as well as decreasing the dynamic load carrying capacity of the part. Unit bearing pressures which exceed the yield strength of the base material are liable to result in "brinelling" with accompanying fracture of the case. If a design necessitates high unit bearing pressures, careful consideration should be given to the selection of the core material. It should be borne in mind that the hardening operation will serve also as a draw to reduce the hardness of low-temperature transformation products and little can be gained by quenching a steel, such as AISI type 420, to produce a high hardness and then tempering the piece back to a relatively low hardness during Malcomizing. If high core hardnesses are required it is usually wise to consider treating the precipitation hardening types of stainless.

Applications of the specially processed stainless steel are as myriad as the uses of stainless steel itself. Successful applications range from high-temperature, high-pressure valve trim to dental drill handpieces. Wherever the normal properties of stainless steel can be enhanced by the addition of a hard, wear resistant surface, there is a potential application. Fig. 5 shows some typical parts.

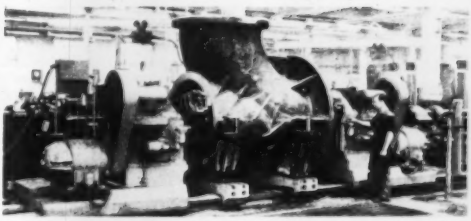
Successful operation of thousands of tons of Malcomized stainless steel bears testimony to the value of the process. However, it is a highly specialized type of surface hardening treatment that should not be used indiscriminately.

Blueprints from Model Layouts

Visual Planning Equipment Co. Inc., Oakmont, Pa., announces its "Repro-Templet System." It is a method for securing blueprints or Ozalid prints directly from 3-dimensional layouts.

A photographic film templet, coated with a pressure-sensitive cement, is furnished to match each piece in the model layout. Once the layout is complete, the templets affixed to a film grid sheet, become the master from which as many prints as needed may be secured.

Big Facing Job



BORING and facing the discharge head ends for a giant mixed-flow pump with new Simmons 6-inch bar horizontal adjustable boring and facing machine. Built by Simmons Machine Tool Corp., Albany, N. Y., the machine is shown here at Ingersoll-Rand's Cameron Pump Division, Phillipsburg, N. J.

Inserts Permit Pump Salvage

Fuel pump castings formerly scrapped because of worn and stripped threads are salvaged with thread inserts made by Heli-Coil Corp., Long Island City, N. Y., in the rebuilding department of Sid Harvey Inc., Valley Stream, N. Y. These quickly installed stainless steel helical-wire thread inserts provide new threads that are stronger, more wear-resistant and more corrosion-resistant than the original threads in the casting.

Between 10 and 20 defective fuel unit castings, or approximately 1 per cent of the units processed are repaired by the wire-insert method each week. At a saving of $3 and more per casting, this amounts to a yearly saving of over $2000. Equally important, these thread inserts permit the continued use of castings that might not be replaceable.

Repair operations follow this pattern: Damaged thread is cut out with a drill larger in diameter than the major diameter of the original thread, hole is rethreaded with a special oversize tap and a helical-wire thread insert is installed.

Operator gives the insert a starting turn into the new thread by hand, and then positions the inserting tool for the final inserting operation. Insert is then screwed into the pump casting until it is a quarter to half a turn below the machined surface of the boss. Entire operation takes 5 minutes.

Originally, castings having damaged threads were salvaged by drilling out the old threads, tapping to the next larger thread size and making oversize parts to fit. This took 2 to 3 man-hours. Neglecting material costs and considering only the labor charge, it was found that repair costs by this method amounted to more than the casting was worth.

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PART III

By R. P. HEUER
Vice President

and

C. E. GRIGSBY
Service Research Engineer

General Refractories Co.
Philadelphia

HOT METAL cars generally are lined with high duty fireclay brick, although natural silica rock is sometimes used. Usually the lining having highest resistance to iron oxide at the service temperature gives best results. Limited trials of sillimanite brick, in sections of greatest lining wear, have been made recently without conclusive results. No trials have yet been made of the unburned basic brick which should give best results where service conditions are most severe.

Several types of alumina-silica refractories are used for linings of hot metal cars of all types. Dense, stiff-mud, high-duty fireclay brick, or regular blast furnace brick, are used for the entire lining of most cars. Standard open-hearth furnace ladle brick, which expand in service, have been used successfully in semiclosed-top ladles, in a few cases, when the iron is not very hot. A monolithic lining of ganister and fire clay is used in cars at one plant where metal is moved only from blast furnace to pig machine.

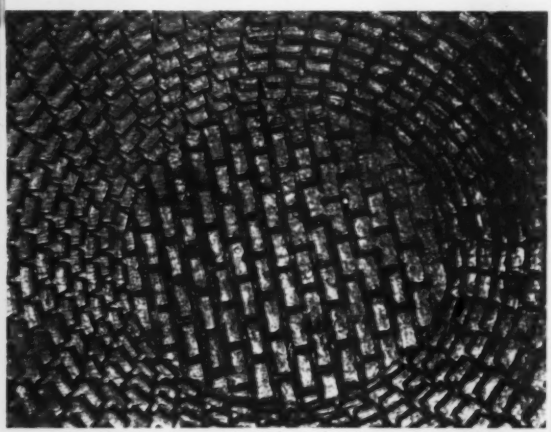

Fig. 8—Typical pencilling of joints of high-duty fireclay brick in a submarine-type hot metal car

Mortars used with these brick have included fire clay, fire clay and grog, and air-setting fire clay or chrome-base mortars; however, those of the high alumina type—notably sillimanite—usually give best results. In some cars, chrome or chrome-magnesite mortars have been used successfully, but when the temperature is high, there have been cases of serious reaction between the brick and mortar. Chrome-base mortars are not recommended for cars where soda is added—especially if amount used is large and temperature high.

Dense Fireclay Brick Indicated — The most economical high-duty fireclay brick lining for hot metal cars, where conditions are not unusually severe, is a special, dense, stiff-mud fireclay brick, laid with thin joints of sillimanite, or other high alumina mortar. When this type of lining is not satisfactory, due to severe conditions, the new, low porosity, high-fired (Cone 18) blast furnace brick, laid in high alumina mortar, such as sillimanite, should give better service.

High-fired super duty fireclay brick are the next logical choice after high-fired blast furnace brick for extra severe conditions, and are preferred by some plants for ordinary operating conditions. These super-duty brick, when laid with high alumina mortar, such as sillimanite, usually give increased service. In one plant, tonnage per lining was increased by more than 60 per cent, and refractories materials and bricklaying costs were cut about in half—as compared to high-duty fireclay brick, laid with air-setting fireclay-base mortar. In another plant, service was increased some 55 per cent, with both chrome-base air-setting, and high alumina, diaspore-base mortars. These mortars have now been replaced with sillimanite mortar. Combination of high-duty, high-fired blast furnace brick, and high-fired super-duty fireclay brick, may give more economical service in some cars than a complete lining of any one type. Pouring lips of some submarine-type cars are made of high-fired super-duty fireclay brick.

Sillimanite Results Variable—When conditions are so severe that no fire-clay brick is satisfactory, high alumina brick of the proper type should give better service. It has been known for many years that re-

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Fig. 9—Unburned magnesite-chrome brick in a modern 800-ton mixer with plastic chrome ore covering the corbels in the bottom of the pouring-out spout

sistance of alumina-silica brick to slag high in iron oxide, increases with the alumina content, but no trials of high alumina brick have been reported until recently.

Sillimanite brick have been tried in several different plants, with conflicting results. In one plant, they cracked and disintegrated in a manner which appeared similar to brick disintegration in blast furnaces. In another plant, where no mixer is used, a band of sillimanite brick, tested in the slag line area of a 196-ton submarine-type ladle, protruded about 1 inch beyond the surrounding high-fired super-duty fireclay brick when the lining was removed, after the ladle had given about 14 per cent more than the best previous life of high-fired super-duty fire-clay brick. A similar installation in another ladle in this plant, gave 23 per cent more tonnage and 13 more days, than the average of all linings of super-duty fireclay brick.

As a result of these tests, two other ladles at this plant were similarly lined, and a fourth ladle lined with low porosity, power-pressed, 60 per cent alumina brick, in the groin area only, for comparison with results on sillimanite brick.

In a third plant, a submarine-type ladle, having a panel of sillimanite brick in the section of most severe wear, gave considerably more tonnage than ever obtained before. Four courses of sillimanite brick around the belly and sides of a similar ladle "apparently heaved in the center from some unknown cause," early in the campaign. They were replaced with super-duty fireclay brick, but after 71,500 tons, the remaining sillimanite brick were in much better condition than were the super-duty brick.

New High-Alumina Brick Promising—There are now available several new, low-porosity, high alumina brick of diaspore or bauxite base. Recent successful trials of 70 per cent alumina brick in hot metal mixers have focused attention on low-porosity brick containing 70 per cent alumina or even higher. Trials of 70 per cent alumina brick in hot metal cars are planned for the near future, and it is believed that they are much more likely to prove economical than sillimanite brick.

Silica Refractories Results Vary—Various types of silica refractories have been used in hot metal cars, with results varying with service conditions. Natural sandstone or mica schist—refractories containing over 90 per cent SiO_2—are sometimes used but they rarely do the job as well as high-duty fireclay brick.

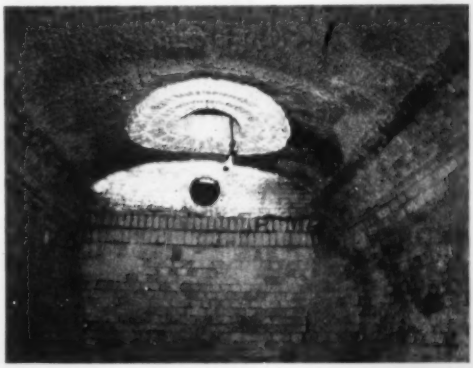
Silica brick should give good service in hot metal cars (if kept above 550° F to eliminate spalling), because the oxides of iron and manganese have no great effect on the brick until they reach high concentrations. However, in one test it was found that silica brick were no better than high-duty fireclay brick (probably because of spalling). Therefore, a trial of spall-resistant silica brick is now proposed.

Basic Brick for Severe Conditions—Limited trials of basic brick in hot metal cars, and results in mixers, give good reason to believe that the proper unburned magnesite-chrome brick will prove economical in hot metal cars where most severe service conditions are encountered. One plant (where these unburned basic brick have been standard in mixers for several years) is considering their use in submarine-type ladles in the throat and slag line areas.

In one plant, burned chrome-magnesite brick, laid in chrome-magnesite mortar, have been adopted as the standard lining for the entire throat of several submarine-type ladles, because conditions are too severe for high-duty and high-fired super-duty fireclay brick. These basic brick also were tried several years ago, as a 3-foot band on both sides of the belly of a ladle, but they were not economical. Burned chrome brick would probably be even less satisfactory.

Magnesite brick have the best resistance of any basic brick to the chemical attack of hot metal car slags, but the burned brick, of both regular and low-

Fig. 10—New installation of unburned magnesite-chrome brick laid in chrome-magnesite mortar forming a complete basic lining from skewback to skewback in this 800-ton mixer



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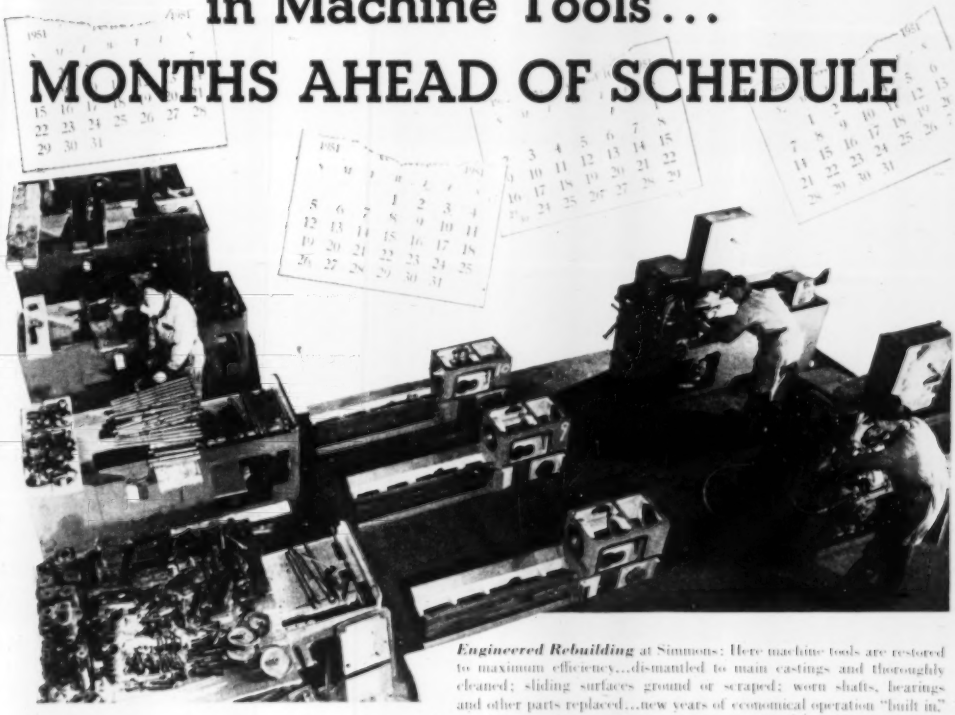

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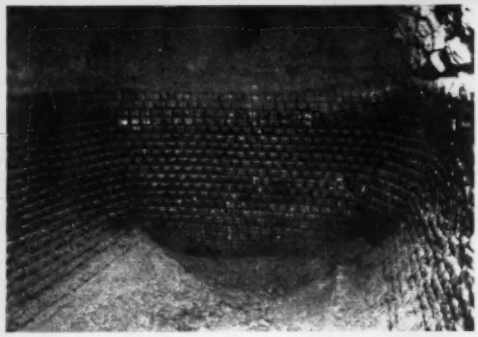

Fig. 11 — Unburned magnesite-chrome brick from skew to skew in a 800-ton mixer after 277,000 tons. Final tonnage on this lining was 560,664—more than 8 times the average tonnage of high-fired super-duty fireclay brick

iron types, would probably spall in most hot metal cars, even worse than they do in the majority of mixers. Unburned, chrome-free, magnesite brick, which are greatly superior to burned brick in resistance to spalling, have interesting possibilities for severe sections of hot metal cars. One large steel producer is planning a trial of these brick, laid in magnesite mortar, at the slag line in submarine-type hot metal cars.

Mixer Service Conditions—These are essentially the same as in hot metal cars, although mixer temperature is somewhat lower in a given plant. Metal temperature is usually between 2350 and 2500 F when it leaves the mixer, despite the fact that most plants attempt to keep the metal from losing temperature by firing the mixer.

Prime cause of lining wear, at the slag line and below, is pencilling of the brick, unless the mortar used is materially superior to the brick in resistance to slag corrosion. Corrosiveness of the slag is determined by its composition, its temperature, atmosphere in the mixer, and type of brick and mortar used. Slag composition is largely dependent on the metal analysis, assuming good skimming at the blast furnace, and no additions for desulphurizing. Slag temperature, and that of the brick at the slag line, varies with temperature of the metal entering the mixer; tonnage of metal per day; type and thickness of lining; and, in the case of fired mixers, with the temperature, luminosity and length of the flame above the metal.

Regardless of metal temperature, slag composition, or type of brick, the use of a high temperature, luminous, long flame above the metal gives a fluid slag and superheats the brick at the slag line. The result is a greatly increased rate of lining wear due to slag corrosion—especially if the atmosphere above the metal line is reducing.

Where Wear Is Greatest—Greatest wear usually occurs around the jambs, bottom of the pouring-out spout, or area around, and under, the pouring-in spout. Trouble with the pouring-in area is eliminated in the newer mixers, where metal is poured in through a hole in the roof, Fig. 10. In the mixer body, most severe wear occurs in a band in the slag line area.

If the level of the metal in the mixer is too low, the bottom brick are subject to erosion from falling metal, and brick in the walls are unnecessarily exposed to splash from metal and highly corrosive slag. If the metal level is too high, there may be excessive wear on the roof and skews on the pouring-out side during pouring. Lining life is, therefore, increased by keeping the metal in the mixer at a level between these two extremes. In the walls above the slag line, and in the roof, brick are subject to vitrification, shrinkage, and thermal shock. Where rectangular jambs are used, excessive wear of jamb brick usually occurs, unless unburned magnesite-chrome brick of relatively large sizes are used. The arches over the pouring-out spout get quite hot during the pouring process, and when the mixer is tilted back into normal position, they cool down rapidly, subjecting the arch brick to severe thermal shock. Flatness of the arch also subjects the brick to comparatively high load stresses.

When the mixer is not fired, brick in the pouring-in spout, or opening, are subject to thermal shock, severity of which depends on the design and method of operating the mixer.

Alumina-Silica Refractories Most Common—Nearly every type of alumina-silica, silica, and basic refractories has been tried as partial or complete linings of hot metal mixers. Alumina-silica refractories are usually used in mixers, except where conditions are unusually severe. Most mixers are now lined with a double lining of either dense, stiff-mud, high-duty fireclay brick, or hearth and bosh blast furnace brick. Standard open-hearth ladle brick were found unsatisfactory in a mixer operated at about 2500 F. Several different operators use siliceous fireclay (semisilica) brick with excellent results in the roofs of mixers.

Mortars used have included fire clay, fire clay and grog, and air-setting fire clay or chrome-base mortars, but those of the high alumina type—especially sillimanite—generally give the best results. Chrome-base mortars may react with fireclay brick in the hottest mixers, and are to be avoided in such cases—especially if soda compounds are used for desulphurizing. For most mixers, low-porosity, stiff-mud, high-duty fireclay brick with thin joints of sillimanite, or other high alumina mortar, are the most economical of any brick of the fireclay type.

High-Fired Brick Show Promise—A lining of dense, high-fired (Cone 18) blast furnace brick was tried in a mixer having extra severe service. The brick were laid up with sillimanite mortar, and side walls and ends installed in herringbone fashion. Pencilling was reduced and the run on the mixer was 1 to 1½ months longer than usual. Thus, these new brick show considerable promise and several other plants are trying them.

Where neither high-duty fireclay brick nor high-fired (Cone 18) blast furnace brick are satisfactory, high-fired super-duty fireclay brick sometimes give better results. Partial or complete linings of these brick, laid with high alumina mortar—usually sillimanite—are giving outstanding results in some mixers. In one plant, where mica schist lasted but 2 or 3 months in a 1500-ton mixer, a lining of high-fired super-duty fireclay brick, laid in sillimanite air-setting mortar, was in excellent condition after it had

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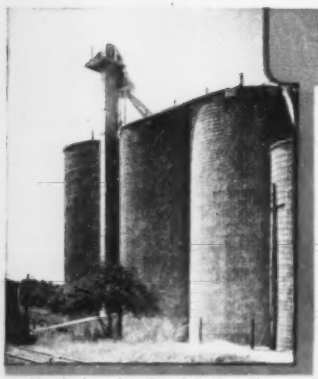

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Vertical and inclined Bucket Elevators with spaced or continuous buckets mounted on chain or belt. A complete line of standards.

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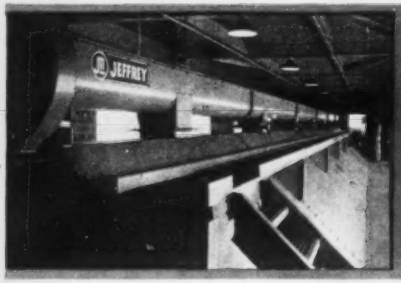

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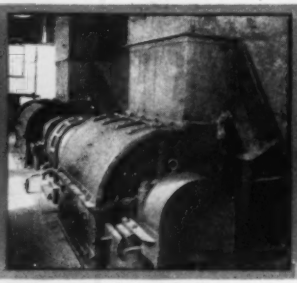

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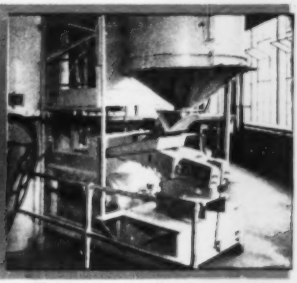

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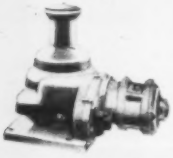
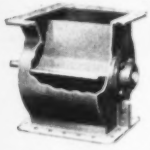


Car Pullers for spotting from one to six cars. Two sizes.

Rotary Bin Check Valves —insure a constant, uninterrupted flow of fine flooding material to vibrating Feeders or WAYTROLS. Also Bin Level Indicators.



Rotary-type Feeder for feeding finely pulverized material. Also Spiral, Apron, Belt, Plate and electric-vibrating type Feeders.

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given about twice the average length of service obtained from mica schist. Cost of this lining was about 2¼ times that of the mica schist lining, but after about nine months service most of the lining was smooth, with virtually no erosion at the joints. This appearance indicates the superiority of sillimanite mortar for use with alumina-silica refractories. The lining was still in service after eighteen months, during which it had given about 7.2 times the average number of operating days, and 3.6 times the highest tonnage ever obtained with mica schist. According to optical pyrometer measurements, metal temperature is 2450-2500° F as it is poured from the mixer. These results were considered highly satisfactory, and the same materials were ordered for relining the mixer.

In another mixer, having the same temperature range, two different brands of high-fired super-duty fireclay brick were not successful, and unburned magnesite-chrome brick laid with chrome-magnesite mortar have been used for almost four years. (See Figs. 10 and 11.) Thus, results with high-fired super-duty brick are not always satisfactory for the slag line and below, but these brick can be expected to give good service in end walls above the slag line, and in roofs when high-duty fireclay brick shrink and spall.

Austrian Steel Works Modernizes

A $7.4 million steel blooming mill makes Oesterreichisch-Alpine Montangesellschaft steel works in Donawitz, Austria, one of the most modern in Europe.

Located in the American zone of occupation the mill replaces one dismantled by the Russians in 1945 as war booty. It was financed by ECA funds.

Scheduled to furnish 60 per cent of Austria's semi-finished steel, the mill is equipped throughout with General Electric drives, controls and switchgear. Designed for a capacity of 75,000 tons of steel monthly, the mill was built and equipped by Morgan Engineering Co., Alliance, O.; International General Electric Co. and Loewy Rolling Mill Division, Hydropress Inc., New York.

The twin mill drive uses two 4000-hp, direct current motors operating on 800 v. These single armature, reversing motors produce 8000 hp at 50 rpm with a maximum of 120 rpm and a peak load capacity of 275 per cent. The motors can be reversed at the 50-rpm level in less than two seconds.

Electronic Brain Controls Gas Turbine

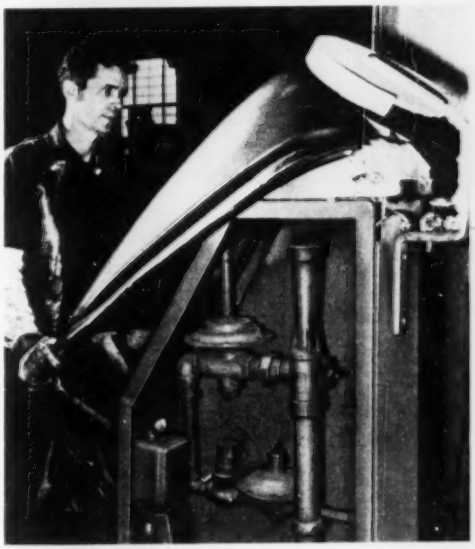
Limited production is started on a device for controlling flow of fuel to gas turbine engines at Hamilton Standard Division, United Aircraft Corp., East Hartford, Conn. Combining an electronic brain with hydro-mechanical brawn, the device already is being used by Pratt & Whitney Aircraft for its big J-57 engine and other applications are being developed. It has passed endurance tests on the engine in test cells and flight testing is in progress.

Fuel control relieves the pilot of a number of specialized duties involving operation of the turbine engine. It accurately governs the speed of the turbine wheel to a close tolerance. The electronic unit directly senses the engine speed, the temperature of the air entering the engine, and the engine's tailpipe temperature. Any tendency by the engine to exceed its design limits of speed and operating temperature is promptly controlled by the electronic unit, which signals the hydraulic unit to reduce the flow of fuel to the combustion chambers.

Hydraulic unit, which serves as the brawn for the electronic unit, also prevents the engine from exceeding its operational limits. It measures the pressure of air in the engine's compressor section, and limits fuel flow to the engine when air pressures build up to the design limit. It also establishes a proportional minimum limit to the flow of fuel at a level which maintains engine operation during reduced power operations.

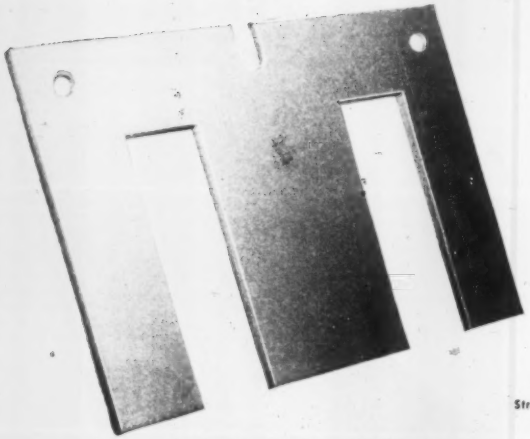
The electronic unit is founded on pioneering research in the field performed for the last eight years by Frank Offner of Offner Products Corp., Chicago.

Heat Right on the Nose

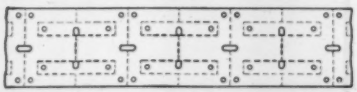


HEATING the area around the headlamp opening in deep-drawn front fenders for Chevrolet trucks now is done in this automatic high-pressure gas burner arrangement. Severity of the draw requires a stress-relieving of the steel around the punched headlamp hole before further forming operations on the rim. Originally done with hand torches, the method now is to place the fender in the fixture shown, which starts the burner and concentrates flames from the inclined head around the hole in the stamping. Through an automatic time control relay the burner is shut off after 18-22 seconds of full heat (1200-1300 F). The fender is lifted off and transferred to a water quench, completing the annealing cycle. Equipment was designed by engineers of the Chevrolet-Cleveland plant. Burners are standard, except for the head which was designed for the job. Fuel is natural gas and compressed air. Appreciable savings in fuel cost over the former oxyacetylene torches are realized, as well as uniform and properly localized heating of the stressed area

MAKES DIES LAST



TRANSFORMER CORE LAMINATIONS like this are stamped from coil stock .018" to .024" thick. Nested arrangement of "E" and "I" shaped laminations, as shown in sketch below, holds scrap to a minimum.



DANLY AUTOFEED PRESSES PROTECT IMPORTANT DIE INVESTMENT AT KOBZY TOOL COMPANY, CHICAGO

Precision 3-stage carbide dies built to hold burrs within .002" on transformer core laminations represent a die investment that is an important cost factor. That's why Kobzy Tool specified unique press precision features like hardened and

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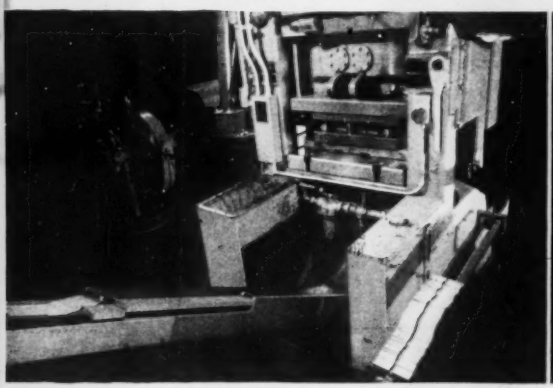

AMPLE BED CLEARANCE above the floor permits efficient piece part handling. Here, finished laminations are delivered—2 "E's" and 2 "I's" per stroke—into stacking chutes from the bottom and side of the die with burred edges stacked in one direction.

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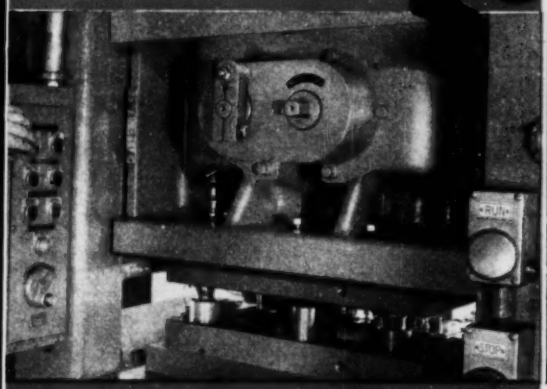
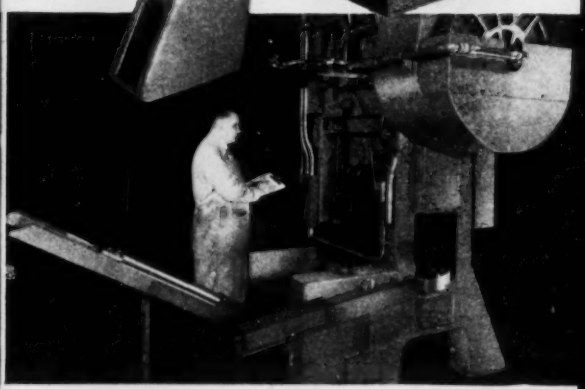


POSITIVE SLIDE ADJUSTMENT through improved Danly worm-type adjusting devices provides convenient shut height control and readily locks to prevent "creep". High precision assures slide parallelism at all settings.



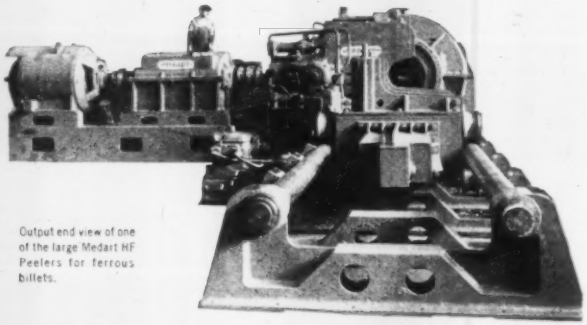
PRODUCTION CONTROL plays an important role in any stamping shop when presses are operating at 210 strokes per minute. A Kobzy supervisor is shown here checking an automatic stroke counter.

Billets Peeled at 20', 30', even 40' Per Minute!

MEDART

MODEL HF

BILLET PEELERS



Output end view of one of the large Medart HF Peelers for ferrous billets.

The output of Medart Billet Peelers is limited only by the capacity of the best available cutting tools! That means the absolute maximum in production at the lowest possible cost!

Built to handle both ferrous billets from 1" to 14" diameter — as well as brass, copper, aluminum and other non-ferrous metals — the throughput speeds of these Medart Peelers range from 1' to 40' per minute, depending upon workpiece size and material. They can be equipped with either one or two cutterheads — arranged for high surface finish or heaviest hogging cuts — and furnished with hydraulic or pneumatic controls, with push-pull feed devices, and for completely automatic operation.

No other scalping or turning machines made can match the production speed or economy of Medart's complete line of Billet Peelers.

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Revolutionary Machines

(Continued from Page 79)

the teeth spaced more widely than in the older method, greater chip clearance is provided.

Because of the character of the hard alloy used for these particular blades, the roots are broached 0.005-inch oversize, the remaining stock being removed on a surface grinder. By this combination of broaching and grinding the desired accuracy of finish is obtained and yet the operation is less costly than the old method of milling.

Further advances in this method of broaching, using individual teeth, is expected as mass-production of jet engines proceeds, until broaching is used on all the surfaces of the blades for both compressors and turbines (except the airfoil surfaces). The use of separate teeth permits many setups that engineers have previously been restricted from using with the conventional multitooth sectional broach.

A particularly attractive feature is that each tooth can be used up completely. This means an appreciable saving in the consumption of high-speed tool steel.

A further step now receiving attention is the use of carbide tips on these individual broach teeth. This is really the motive behind developing the individual tooth idea in making broaches. As the materials used become more difficult to machine, the need for carbides and the "know-how" of grinding them clearly becomes more urgent.

Grafting Lathe Head Onto Grinder. Making large numbers of large diameter, thin-walled rings and weldments calls for close control of size and surface finish that can best be achieved on a grinding machine. Subsequent operations required on these parts — such as recessing and chamfering — would ordinarily be done on another machine, for example an engine lathe or a boring mill.

The idea was conceived of a combination machine which carries out the lathe operation while the ring is still mounted on the grinder. By mounting the turning slide from a Monarch engine lathe onto the bed of a Heald No. 174 internal grinder, the recessing or chamfering can be done without removing the piece from the chuck.

Because these thin-wall rings are very light and the cuts to be taken in the second operation are so slight, this method of using only one setup is attractive in giving greater accuracy by keeping all the cuts concentric and in reducing setup time.

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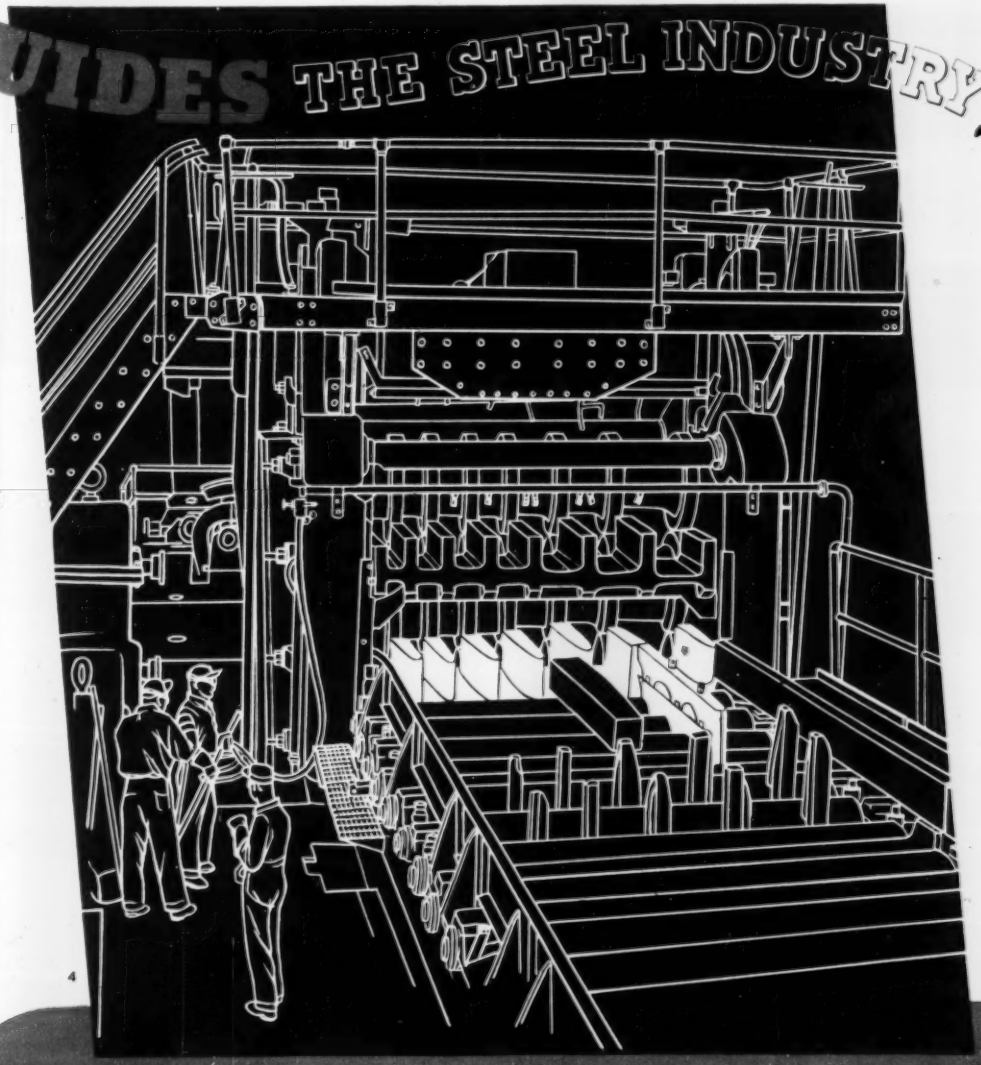


Wear-Resistant Tools for the Rolling Mill Industry

Youngstown Alloy Casting Corp. . . . **Youngstown, Ohio**

In addition, there is a considerable saving in capital investment, since the cost of a lathe capable of swinging a ring as large as 48 inches in diameter would be high. All that was needed here was the delicate touch of a smaller engine lathe, which is provided by the added cross-slide.

Flexibility Plus Extra Rigidity — In producing compressor and turbine disks for new engine designs a large number of disks of various sizes is called for, all subject to design changes. The turret lathe's flexibility, combined with its more or less "permanent" tooling, seemed the obvious answer to this requirement, provided that it could be combined with plenty of rigidity for easy machining of heat-resisting alloys with carbide tools.

Tool engineers recalled an early Harkness turret lathe design, antedating World War I, that had a heavy flat sliding-head turret carrying an abundance of tool-holding screws. They suggested to Jones & Lamson that this idea be incorporated in a modern design of heavy-duty turret lathe. Result was the rugged J & L 10-B cross-sliding turret lathe.

Extra support for the tools as they cut is obtained by means of a hardened steel plate which spans the gap in the carriage, abutting against the base of the small four-way tool post. On this plate "ride" the hardened steel bolts that project from the lower part of the tool-holders on the large six-way turret. This gives maximum rigidity to the cutting tools, since there is, in effect, no overhang of the turret.

A large number of tool-holding screws is provided on the turret, strategically placed so that a wide range of tools can be mounted. The flexibility of the turret lathe thereby can be fully realized.

The single-point tools are positioned in the holders by templates corresponding to the contour of the disk to be cut. Using an assortment of templates, it is believed possible to machine 16 different sizes of disks on both sides. Not all the tools for this range of sizes can be set up on the turret at once, of course, but it will handle at one time all the tools for machining both sizes of two sizes of disks. Several tools can be used to remove metal simultaneously, in plunge-cutting the high-alloy forgings from which compressor and turbine disks are made.

New Instrument Practices

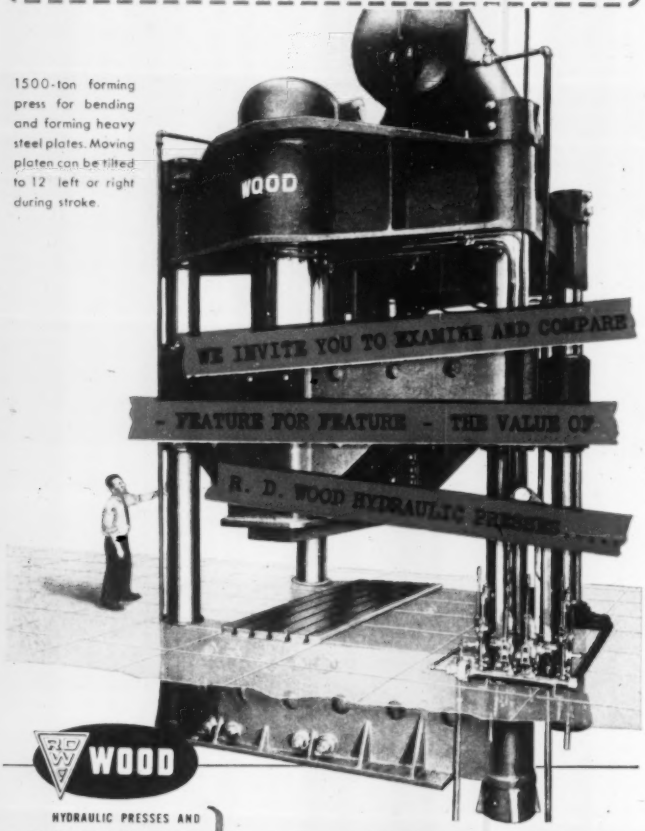
Two new tentative recommended practices are announced by Instrument Society of America. One concerns flowmeter installations, seal and condensate chambers.

Three methods of fabrication are shown on the drawings, each illustrative of acceptable manufacturing practices. Two alternate types of condensate or seal chamber are illustrated, each of which may be fitted with any of the three end arrangements. The form of seal and condensate chamber advocated by this recommended practice is consistent with those available either from manufacturers or by field fabrication, and is currently used in a majority of installations. Price is 50 cents each.

The other practice covers uniform face to face dimensions for flanged control valve bodies. Dimensions covered are face-to-face body dimensions for flanged end valves of both cast iron and steel through 600-pound flange ratings. Sizes included are ½ through 8 inches. Only flanged valves which are in the category of diaphragm actuated control valves of the plug type are included.

The dimensions were developed by the majority of control valve manufacturers with the assistance of the National Steam Specialty Club, when it became known that the user in-

If it's an R. D. WOOD... It's Good*



1500-ton forming press for bending and forming heavy steel plates. Moving platen can be tilted to 12° left or right during stroke.

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HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE
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A Material Handling *CHECK LIST...*

All Jobs for LORAINS

The 16 material handling attachments shown below can be used with a labor-saving Lorain Crane . . . to make it one of the most useful machines around your plant. Check these materials Lorains can handle against your operations. You'll find "101 ways" a Lorain Crane will pay dividends—in man-hour savings, reduced car demurrage, increased storage and faster material flow. Ask your Thew-Lorain Distributor for facts about Lorains on crawler or rubber-tire mountings.

THE THEW SHOVEL CO.
LORAIN, OHIO

NATIONAL CASH REGISTER CO. of Dayton, Ohio, uses a Lorain crawler crane with clamshell bucket to unload coal from incoming cars.

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CLAMSHELL	ORANGE PEEL	DRAGLINE	MAGNET
Crushed Stone · Ashes · Cinders · Sand · Coal · Slag · Ore · Excavations	Scrap · Ashes · Cinders · Excavations	Crushed Stone · Ashes · Cinders · Ore · Excavations · Sand	Scrap · Pig Iron · Turnings · Rails · Pipe · Castings · Punchings

✔ FOR HEAVY PIECES

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TONGS	CLAMPS	GRABS	GRAPPLE
Railroad Ties · Timber · Logs · Poles · Bales · Rail	Lumber · Ties · Forms · Shapes · Bar Steel · Sheet Steel	Poles · Railroad Ties · Pulpwood · Mine Timbers	Boxes · Crates · Pipe · Pulpwood · Barrels · Lumber · Bundles

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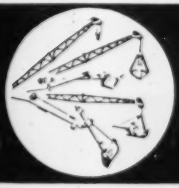
For handling concrete, pouring into forms, etc.	Ore · Cinders · Foundry Sand · Ashes · Bulk Materials	For small finished or semi-finished parts	Breaking up scrap. Demolishing masonry

THEW LORAIN®
on CRAWLER or RUBBER



SHOVELS
CRANES
DRAGLINES
CLAMSHELLS
HOES

DESIGN ENGINEER
METAL MILL EQUIPMENT

SKF
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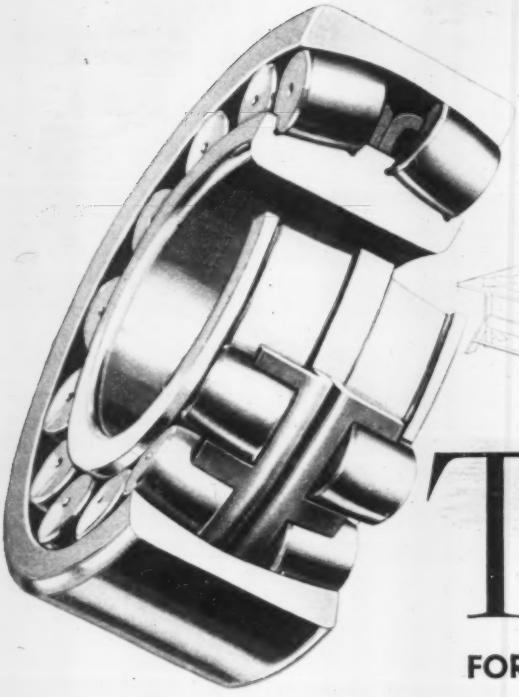

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BALL AND ROLLER BEARINGS

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

integrity • craftsmanship • metallurgy
tolerance control • surface finish
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field service

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.— *manufacturers of* SKF *and* HESS-BRIGHT *bearings.*

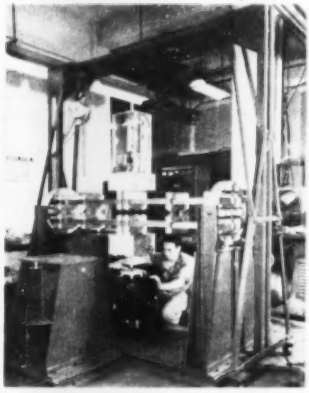
dustry was 100 per cent in agreement that uniform face to face dimensions for control valves were desirable. Price is 25 cents each from the society at 921 Ridge Ave., Pittsburgh 22.

Y-Type Reversing Mill Described

Bulletin No. 1D51, a 16-page technical booklet that describes and illustrates the Y-type reversing cold strip mill, is being distributed by Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3. Mill is available in widths ranging from 16 to 66 inches, or larger, for the cold rolling of all grades of steel, brass, copper, aluminum and similar metals. The manufacturer claims the Y-type roll arrangement, using small diameter work rolls in a compact, rigid housing, results in greater penetrating ability than other types of mills. Greater accuracy of finished gage, and equivalent surface finish also are claimed for the mill.

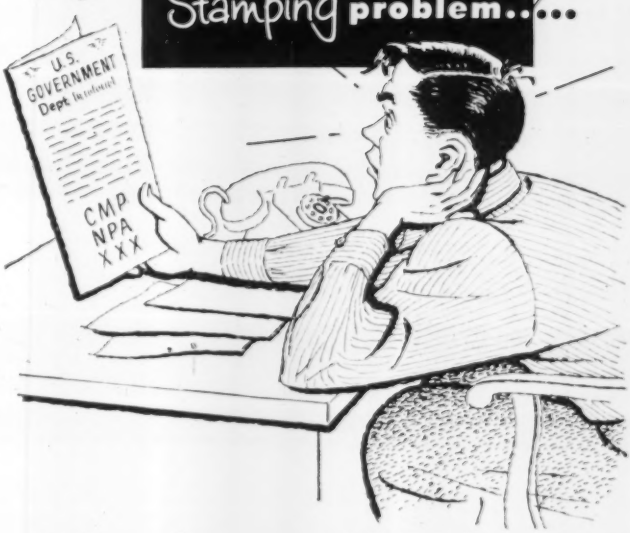
The mill in general is discussed with specific attention given to its design, the roll arrangement and tentative gage reduction schedules. A large

Vibration Testing



THIS is a reactionless beam resonator, believed to be the only instrument of its kind in existence, a part of the environmental test facilities of the Air Materiel Command's engineering division at Wright-Patterson Air Force Base, Dayton, O. Here aircraft components and structures are subject to vibration analysis through a wide range of frequencies in the effort to discover explanations for failures or potential vulnerable points, and to work out their correction. Importance of this type of testing may be inferred from recent field experience involving the loss of a $3 million airplane because of vibration failure in a $2.50 circuit breaker leading to a fatal fire

If that new contract involves a Stamping problem.....



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No need to worry over investment in expensive presses or new personnel. Geometric gives you a whole new manufacturing department, free of overhead expense and operating worries; a department with 37 years of proven skill in the engineering and manufacturing of medium and heavy stampings.

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phantom drawing shows the mill with complete work, driving, and backup rolls seen in their exact locations within the housing. Photos and schematic drawings aid in presenting views of the rolls and bearings, mill screw arrangement, pinion stand, threader leveller, tension reels and coil stripper. Electrical equipment for main mill drive is presented in tabulated form, and principal mill data tables cover motor and strip speeds, gear ratios and maximum available tensions.

Gear Distortion Curbed Sharply

Development of a new gear-manufacturing process employing carborization, which limits distortion to 0.001-inch per foot of diameter, is announced by Gunnar E. Gunderson, president of the Brad Foote Gear Works Inc., Chicago.

Although the process of carborization has long been recognized as a hardening method in the manufacture of gears, he explains, this process is unique in that the heat treatment is controlled to an unprecedented extent. The accuracy of the heat regulation accounts for the fine tolerances achieved, he says. As an example, he points out that with the new process there are now some 20-inch gears in production which distort less than 0.0015 inch, while the distortion of identical gears manufactured by the old method varies from 0.015 to as much as 0.045-inch.

Brad Foote's refinement of carborization hardens the meshing surfaces of the teeth in the gears to a high degree while leaving the cores of the teeth soft but tough. The result is that a certain flexibility is realized, the advantage being that the impact on the teeth is reduced through absorption of some of the shock by the soft cores, he says. Accordingly the specially treated gears are longer wearing while the efficiency of machinery containing them is substantially improved.

Military Bearings To Be Canned

Timken Roller Bearing Co., Canton, O., being a large supplier of bearings for the armed forces, is actively cooperating with them in an effort to solve the corrosion and shipment damage problem by packaging the bearings in metal cans. Several packaging machines have been purchased and a pilot line is being set up to try various methods of packaging the bearings in this manner and to determine the type of can which will be most practical.

This type of packaging, being new

PRECISION TURNING POINTS

for tiny shafts

For extremely small shafts in fractional h.p. motors, instruments, home appliances, cameras and projectors, Fafnir makes several series of *extra small ball bearings* . . . in metric bore sizes down to 4 mm and in inch sizes down to 1/8".

The advantage of these small bearings show up in several ways. For the portable converter illustrated, they assure instantaneous, dependable response no matter how long it has remained idle. Bearing lubrication is eliminated . . . under normal conditions. Shaft wear reduced to a minimum.

Fafnir Extra-Small bearings are available with standard, special or super-precision tolerances . . . in various constructions. They can be fitted with grease shields, Mechani-Seals or Plya-Seals.

An important reference catalog

The new Fafnir Instrument Ball Bearing Catalog provides valuable data on dimensions, load ratings, tolerances, mountings etc. Also information on ball bearing standards and illustrations of typical applications. Send for a copy. The Fafnir Bearing Company, New Britain, Conn.

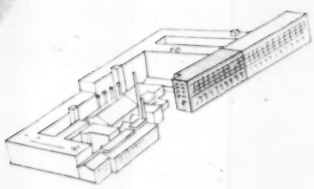
FAFNIR

BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

PROGRESS REPORT

DOING OUR BEST



To try to keep abreast of an unprecedented demand for Fafnir Ball Bearings we're doing our best to provide greater production facilities.

One phase of this expansion program is the recently completed, 6-story modern addition to the main Fafnir Plant. It adds 70,000 square feet of manufacturing space to the 750,000 previously included in the 4 Fafnir Plants . . . now, almost 19 acres.

Firth Sterling

STAR·MO M-2

conserves critical materials to everyone's

ADVANTAGE!

- ★ 29% Lower Base Price
- ★ 7% More Tools per Pound *(lower spec. grav.)*
- ★ Tougher than standard 18-4-1 Class B High Speed
- ★ Very good abrasion resistance
- ★ Lower Hardening Heats

Lower power consumption
Reduced wear on salt bath equipment

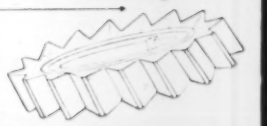
Specify STAR-MO (M-2) for . . .

TAPS,

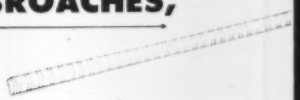
TWIST DRILLS,

REAMERS,

MILLING CUTTERS,



BROACHES,

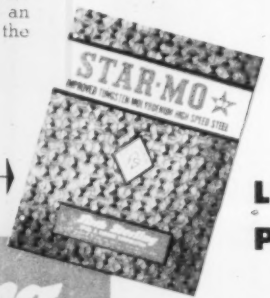


THREAD CHASERS,
LATHE and
PLANER TOOLS

Star-Mo (M2) turns the necessary substitution requirements of NPA to *big advantages* for High Speed steel users.

Firth Sterling's Star-Mo (M2) is tougher than the standard 18-4-1 Class B High Speed when it is in the heat treated condition. Star-Mo (M2) also has an abrasion resisting quality approximately equal to the standard Class B 18-4-1 steel.

Write for Bulletin SL-2036



Firth Sterling

STEEL & CARBIDE CORPORATION
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R-243

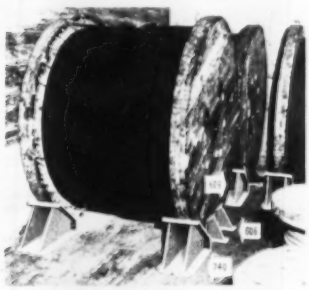
to the bearing industry, will be thoroughly tested before it is offered to the armed forces. It is believed that canned bearings can be stored under the worst conditions for a period of time up to ten years without deterioration of the bearings.

Test Standards Get Approval

Featured by 23 technical sessions at which 110 technical papers were presented covering various aspects of engineering materials, the 1951 annual meeting of the American Society for Testing Materials, held at Atlantic City, N. J., also included 615 meetings of the technical committees.

Sixty-two of the society's technical committees reported at the meeting, with the result that 57 new specifications and tests were approved and revisions in over 200 existing tentatives and standards were acted on. About 75 specifications and tests that have been published previously as tentative were approved for reference to society letter ballot for adoption as standard. All of these new and revised specifications will be published later in the year. Including the 1951 annual meeting actions there are now about 1775 ASTM standards. This compares with the figure 20 years ago of 625 and ten years ago of about 1045. These figures indicate a definitely increased tempo in standardization activities during the last decade.

Wire Reel Securely Anchored



HOLDING cable, wire and wire rope shipped on reels is usually a tough problem in railroad shipments as these heavy cylindrical bodies are loaded the long way in freight cars for safety reasons. Macwhyte Co., Kenosha, Wis., uses Peyton spur cleats made by National Dunnage Co., Dallas, to solve this problem. Other cleats of the same family are used to hold down a variety of shapes in less than carload shipments

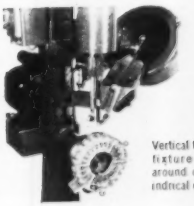
ADD "Jet Plane Speed"

To Your ASSEMBLY JOBS With These Versatile

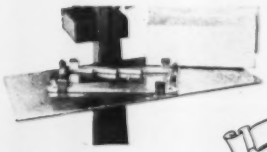
DETROIT POWER SCREWDRIVERS

3 SIZES to drive screws from No. 2 to ¾". Model A pictured. Capacity No. 2 to No. 6 screws.

Banish slow, dragging hand methods that eat into your profits. Drive screws with almost incredible speed by using Detroit Power Screwdrivers, the outstanding hopper-fed machines that pay for themselves quickly, then pay big dividends in stepped-up production and lower labor costs—they drive screws as fast as one a second, doing a perfect job without damage to heads or threads . . . all types of screws . . . driven to uniform tension. So, if your assemblies are fastened with screws, take off now to record-breaking assembly speed by adopting Detroit Power Screwdrivers. Let them prove their indispensability in your plant.



Vertical type, manually operated fixture assembling screws around outer periphery of cylindrical die casting.



Driving twenty screws in cabinet side shields in 57 seconds.

1926 Our 25th ANNIVERSARY 1951

Send for further details, also information about D.P.S. Motorized Hopper Units, Nut Drivers and Special Assembling Machines.

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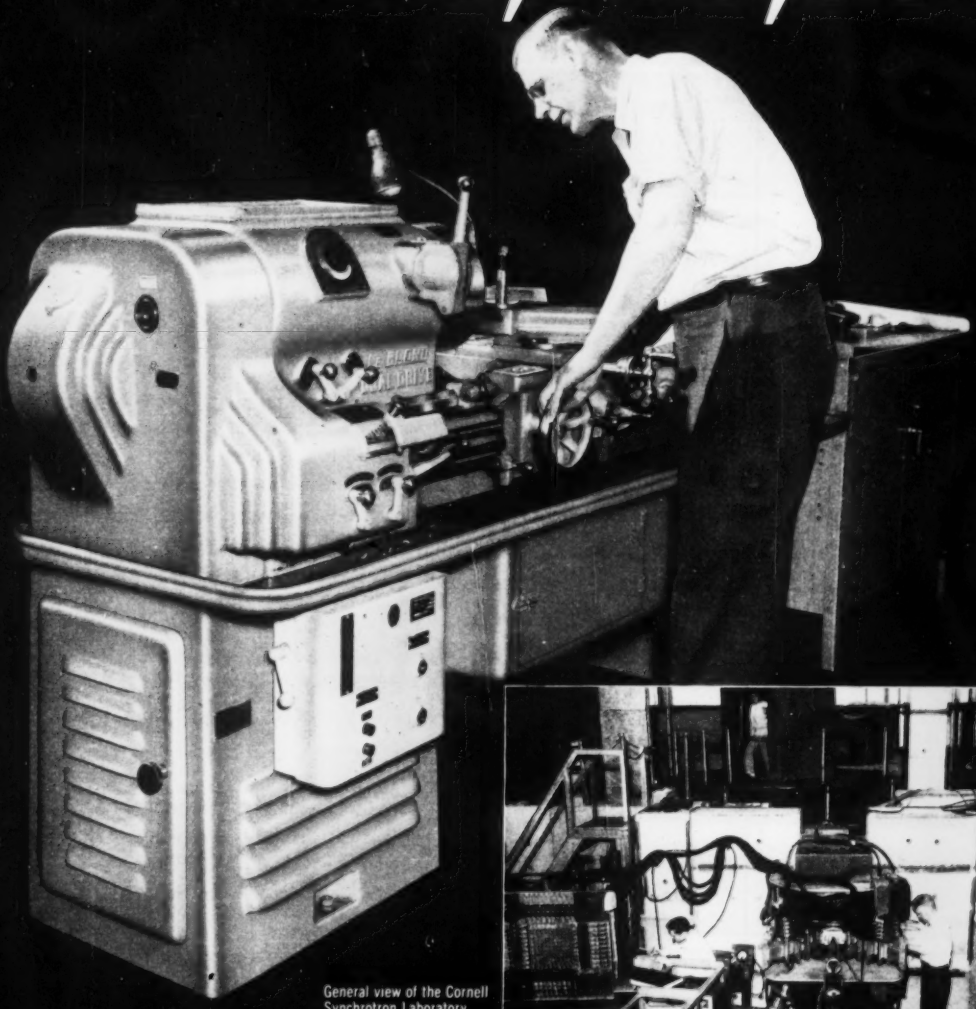
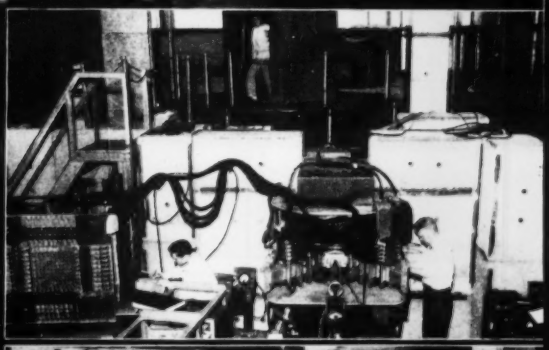
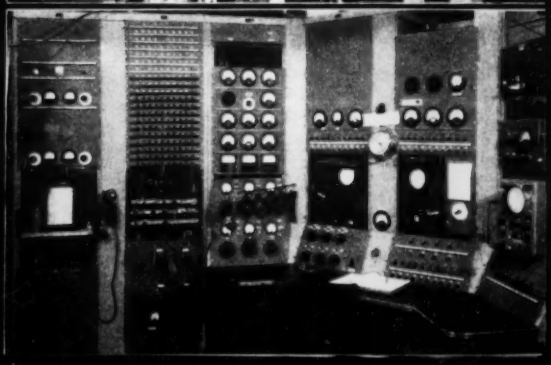


Precision turning of a special part on the LeBlond Dual-Drive Lathe Cornell University Floyd Newman Laboratory of Nuclear Studies.

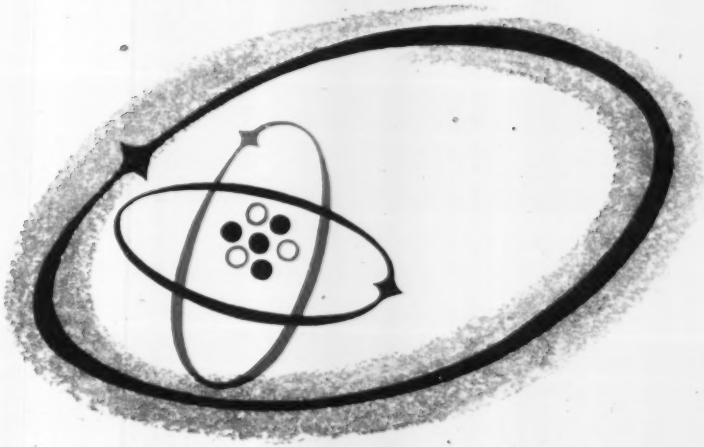


General view of the Cornell Synchrotron Laboratory.



Master control panel keeps check on synchrotron.

electron volts work here!



Cornell University's synchrotron accelerates atomic particles to energies of 300,000,000 electron volts. It makes possible the study of atomic nuclei and the forces which hold them together.

The Floyd Newman Laboratory of Nuclear Studies at Cornell needed a versatile, precision lathe to turn the myriad of special parts that go into a synchrotron . . . vacuum pump parts and connections, oscillator tube elements, cloud chamber components, plastic lenses, parts for a special stereoscopic camera, and many more.

They installed a new LeBlond Dual-Drive Lathe, recommended by LeBlond Distributor J. F. Owens Machinery Co. of Syracuse, N. Y. Result? Fast, convenient turning of a great variety of special parts to tolerances as low as .0002".

This new LeBlond Lathe provides hardened and ground steel bed ways; twelve speeds from 28 to 1800 r.p.m., all at full power; 96 feeds from .0004" to .1062"; 48 threads from 4 to 224; 15" swing, 3 h. p. motor. It gives you single-lever speed control; positive-jaw feed control; automatic lubrication to headstock, feed box, apron and ways; totally-enclosed quick-change box; and the American Standard taper spindle nose. You get more for your money in a LeBlond Dual-Drive than in any comparable machine.

Likely you'll never build a synchrotron. But for all the turning jobs you do encounter, there's a LeBlond Lathe to turn them faster, better. Your LeBlond Distributor will tell you about the Dual-Drive and other late models. Call him or write—

THE R. K. LeBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for Bulletin No. 46 for more information on the Dual-Drive

turned faster by **LeBLOND** *of Cincinnati*

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 63 YEARS

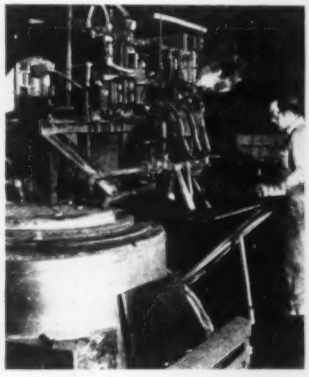
Bar Solder Cast Automatically

TIN-LEAD solders and other white metal alloys in the form of small bars have until recently always been hand-poured in open molds. This resulted in bars which varied in weight, were subject to contamination with entrapped oxides, differed in appearance, and were often subject to segregation of constituent metals.

This unscientific method of casting was in sharp contrast to advances made in the pure metallurgy of solders, babbitts, type metals, etc. It was an anachronism, and development engineers at Federated Metals Division, American Smelting and Refining Co., set out to do something about it.

To achieve their objective they decided the following were prerequisite: A means of withdrawing molten metal for casting from the bottom of the melting kettle. This would reduce dross entrapment to a minimum. Closed molds for the metal casting. This would give uniformity of dimension and controlled cooling. Means of rapid cooling and solidification to reduce aggregation. Means of controlling the direction of solidification through cooling. A means of filling molds that would minimize oxidation and insure proper "feeding" of the molten metal. This would offset the shrinkage due to cooling and solidification.

Following early success of the first experimental model, seven patented Castomatic machines were built and put into service at various Federated plants. Briefly described, an installation is made up of the following components: Melting kettle, molten metal circulating pump, molten metal circulating system, molds that connect to suitable outlet parts on the molten metal circulating system, a hydraulic system that furnishes the power required and an electronic control system that governs the machine cycle.



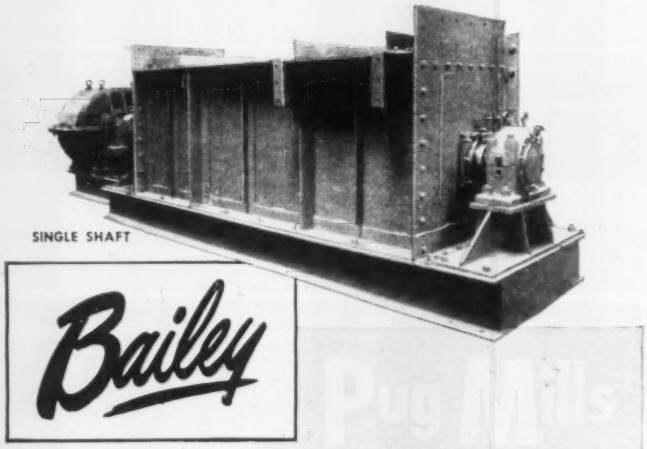
AUTOMATIC CASTING INSTALLATION
. . . produces better quality solder

In operation, the machine's cycle is governed by the particular alloy and bar size being cast. At intervals thus determined the molds open, finished bars fall out onto a receiving chute and the molds close. Range of bar sizes and weights which can be cast is rather large.

Metallurgical and physical properties are far superior to those of other bars produced by different casting methods. Bars are virtually free of entrapped drosses, are uniform in dimension and weight, are clean and shiny, and show a minimum of segregation.

Aluminum Association Meets

Among important matters receiving attention at the Aluminum Association's summer meeting held recently at White Sulphur Springs, W. Va., was the tentative approval of standard nomenclature for alumi-



Service records of up to twenty years continuous operation prove the soundness of Bailey Pug Mill design and construction. Types for either Dust Catcher or Sintering Plant service, single or double shaft, direct or rope drive.

We will be glad to send you a bulletin giving full information about Bailey Pug Mills.

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LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

SANDVIK
SPRING STEEL'S
Double-Accuracy
CUTS COSTS TWO WAYS

Here is how Sandvik's *double accuracy* will cut your costs.

1. It cuts rejects by being consistently within specified gauge.
2. Sandvik's greater precision brings gauge closer to *exact* size . . . gives you more parts per pound.

What's more, Sandvik steel's uniform physical characteristics from lot to lot means longer tool life plus better performance of the finished part.

For quality spring steel, check with Sandvik. Sandvik cold-rolled, high carbon strip steel is available:

- **Precision-rolled in thicknesses from .001"**
- **In straight carbon and alloy grades**
- **In special analyses for specific applications**
- **In more than 800 stock sizes**
- **Annealed, unannealed or hardened and tempered**
- **Polished bright, yellow or blue**
- **With square, round or dressed edges**

Phone, wire or write your nearest Sandvik office for further information or technical help.

SOME SANDVIK SPECIALTY STRIP STEELS—Steel for Textile Machine Parts • Band Saw Steels, Metal Band, Wood Band and Butcher Band • Camera Shutter Steel • Clock and Watch Spring Steels • Compressor Valve Steel • Doctor Blade Steel • Feeler Gauge Steel • Knife Steels • Razor Blade Steel • Reed Steels • Shock Absorber Steel • Sinker Steel • Spring Steels • Trowel Steel • Vibrator Reed Steel, etc.

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1. Consistently within specified gauge
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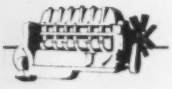
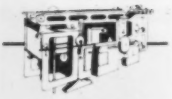
To make YOUR product

work better... last longer



DESPITE all the care you lavish on the design and construction of your product, its successful performance may ultimately depend on a few, relatively small, gears. That's why it makes good sense to use only gears of *established quality*. FAIRFIELD GEARS have proved themselves "in use" on an almost limitless range of industrial products during the past 30 years. They are made-to-order—any type, and in a wide variety of sizes—to meet your special needs.

On your next gear problem, call in FAIRFIELD at the start. FAIRFIELD engineers are qualified to make expert recommendations that may save you time, money and future concern about gear performance in your product. Write for interesting, illustrated brochure.



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num sheet and extruded products. Final approval of these items is expected in the near future. Progress of the current expansion program and operating procedures under the Controlled Materials Plan were among other industry problems discussed.

Attendance, which is restricted to member company personnel and invited guests, totaled about 140. Association membership now includes 42 companies, which account for all primary aluminum produced in the United States and about 85 per cent of all semifabricated products.

Plating Prolongs Pin Life

Four advantages are claimed by Baldwin-Duckworth Division, Chain Belt Co., for their present method of copper-plating roller chain pins. It assures optimum hardness, uniformly good riveting, greatest holding power and permits easy chain cutting.

After cutting, machining, rough grinding and tapering of the pin ends, the pins are entirely copper plated in a copper solution bath. Next, copper is ground off the pin's shank, leaving only the two extreme outer parts of the pin body and ends still plated.

Since copper does not absorb carbon, in the case hardening operation, only the pin's body (the bearing area or working surface in the assembled chain) absorbs carbon. This leaves the pin ends comparatively soft. The body of the pin is then given a finishing grind and is ready for assembly.

Vacuum Impregnation of Resins

Current leakage in armatures of generators and motors in diesel-operated locomotives is effectively reduced through vacuum impregnation of these units with thermosetting resins. Vacuum impregnation is achieved by exhausting air from a chamber in which the armatures are placed. When a high vacuum has been reached, the chamber is flooded with liquid resinous insulating material. Due to the complete absence of air and moisture, the resin thoroughly penetrates all armature windings and assures permanent efficient insulation supplementing the conventional wrapped or tubular covering.

Thus high dielectric efficiency of the motor or generator is assured; power loss is reduced and interference between conflicting stray currents from adjacent conductors is virtually eliminated. In addition, the hardened impregnant imparts mechanical stability to the many coils of wire and insulation in rapidly rotating armatures, and inhibits the tendency of these complex mechanisms to "explode" and bind in the stator under

BRING OUT **BUILT-IN PERFORMANCE** OF MOTORS, MACHINERY AND EQUIPMENT FOR **MAXIMUM SAFETY**

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MOTOR STARTER LINE

FOR USE WHEREVER

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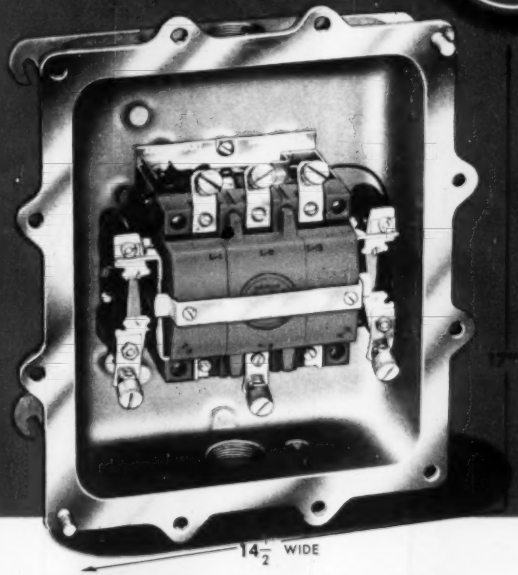
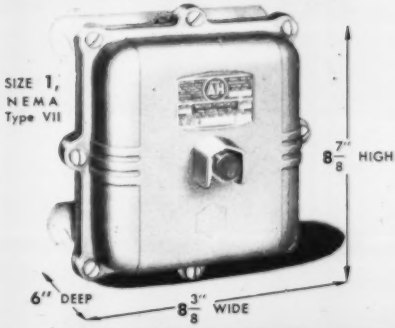


- 2/3 the SIZE
- 2/3 the WEIGHT
- SUPERIOR PERFORMANCE
- HIGHEST RESISTANCE to CORROSION
- STARTER and CONTACTOR SIZES 0, 1, 2, 3, 4

COMPLETE LINE •• UNIFORM DESIGN

Wherever hazardous conditions exist, specify and buy the finest motor control for machinery and equipment — EXPLO-SAFE MOTOR STARTERS by ARROW-HART. In a new, improved cast Feraloy enclosure, these "RA" Magnetic Starters, acclaimed by design-engineers, manufacturers and electricians alike for outstanding performance, are now available in NEMA Type VII, Class I, Group D; Type IX, Class II, Groups E, F, G; and Type IV. Consider these important features — (1) Feraloy housings, possessing high tensile strength and unusual resistance to corrosion, are cast of a special alloy by Crouse-Hinds. (2) Just 2/3 the size of outmoded solenoid type starters. (Compare dimensions listed on reverse side.) This means new opportunities in layout and more compact control centers. (3) Just 2/3 the weight is welcomed by installation and maintenance crews. (Compare weights on next page.) Accumulated floor load is materially reduced. (4) Right Angle design innovations combined with alkyd hood and base assure full protection. For additional information note EXPLO-SAFE folder offer and product data on following page.



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THE ARROW-HART & HEGEMAN ELECTRIC CO.

HARTFORD CONNECTICUT

BRANCHES AND WAREHOUSES IN PRINCIPAL CITIES

ELECTRICAL CONTROL

ARROW AH HART

ESTABLISHED IN 1890

ELIMINATE COSTLY INSTALLATION PROCEDURE

PROVIDE MAXIMUM SAFETY WITH

EXPLO-SAFE©

COMPLETE LINE OF MOTOR CONTROLS FOR OUTSTANDING PERFORMANCE IN

HAZARDOUS LOCATIONS

SMALL IN SIZE ***LIGHT IN WEIGHT***

INSTALLING SIZE 2 EXPLO-SAFE STARTER

There's increased protection for hazardous locations with Arrow-Hart's new EXPLO-SAFE and Weatherproof Magnetic Starters . . . a complete line of uniform design available in NEMA Type VII (Explosive Gas), Type IX (Explosive Dust) and Type IV (Weather-proof). There's superior performance, too, in the "RA", Right Angle, operating mechanism . . . a revolutionary design that accounts for 2/3 reduction in size and weight. Straight-thru front wiring . . . simple parts replacement with ample working space . . . make these starters easier, less costly to install and service. Heavy-duty contacts; simple, sturdy construction; guided-alignment — all combine to give you long, dependable service in the smallest motor starter line on the market.

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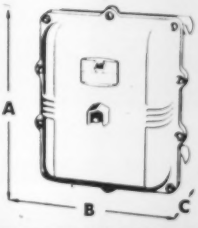
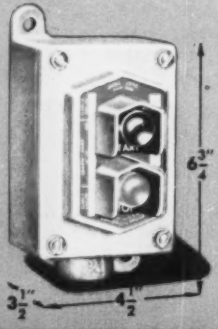


ARROW-HART EXPLO-SAFE PUSH BUTTON STATIONS



In hazardous locations for circuits up to 600 volts A.C. maximum. Push Buttons are available in variety of arrangements and contact requirements. Rotary type selector switch provides 2 or 3 position operation. Pilot lights with colored lenses also available. Stations custom assembled from stock parts for your specific needs.

TYPE 27907-E

DIMENSIONAL AND WEIGHT DATA FOR ACROSS-THE-LINE STARTERS

SIZE	A—HEIGHT	B—WIDTH	C—DEPTH	TOTAL WEIGHT (lbs.)
	Dimensions In Inches			
NEMA Type VII, Class I, Group D, Explosive Gas and Vapors				
0	8 7/8	8 3/8	6	18
1	8 7/8	8 3/8	6	18
2	14 1/8	11 5/8	7 9/16	59
3	17	14 1/2	9 1/8	106
4	23	17 7/8	11	233
NEMA Type IX, Class II, Groups E, F, G, Explosive Dust, Fibers and Flyings				
0	8 7/8	8 3/8	5 5/8	14
1	8 7/8	8 3/8	5 5/8	14
2	13 3/4	11 3/16	6 3/4	34
3	15 3/4	13 5/16	8 3/16	52
4	22	17	9 3/4	132
NEMA Type IV, Weatherproof				
0	8 7/8	8 3/8	5 5/8	14
1	8 7/8	8 3/8	5 5/8	14
2	13 3/4	11 3/16	6 3/4	34
3	15 3/4	13 5/16	8 3/16	52
4	22	17	9 3/4	132

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WRITE TODAY—FOR COMPLETE ENGINEERING DATA ON EXPLO-SAFE STARTERS

ARROW-HART

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the conditions of heat, high speed and heavy vibration encountered in diesel locomotive operation.

F. J. Stokes Machine Co., Philadelphia, produces equipment for a variety of applications of vacuum impregnation for food, tobacco, leather, and wood processing, instrument manufacturing, and other electrical equipment manufacturing.

Shipping Record Is Perfect

In the 10 years that A. H. Bromann Jr. Inc., Schiller Park, Ill., export packager, has protected its metal shipments with rust-preventive compounds, not one item has been ruined by rust, the firm's president, A. H. Bromann says. Without the rust preventives which are made by Nox-Rust Chemical Corp., Chicago, rust and corrosion would have caused losses up to 50 per cent of the dollar volume of shipments, he estimates.

Metal products make up a large part of the shipments. Tools, dies, automotive parts, presses, precision instruments, motors, and castings are some of the many items handled. Whenever metal is protected for shipping, it is sprayed, painted, or dipped in Nox-Rust oils and compounds.

Some shipments of metal parts are enclosed in Vapor Wrapper, a wrapping paper that makes it unnecessary to grease metal for protection prior to shipment. It contains the chemical, Callex, which gives off a rust-inhibiting vapor that renders moisture noncorrosive. It saves considerable time for the receiver as well as the shipper, as there is no need to degrease the merchandise on arrival.

Design Change Cuts Costs

One change in the design of the boom tilt mechanism on the PH 862-130 lift truck made by Gerlinger Carrier Co., Dallas, Oreg., resulted in a saving of 32.6 per cent in assembly labor costs. Old specifications used a hot-rolled mill tubing cylinder with welded flanges. New arrangement employs Rockrite close-tolerance compression-formed tubing, distributed by Joseph Ryerson & Son, Chicago, the substitute method directly responsible for present production economies.

Under the old setup, the tilt cylinder had to be bored and flanges had to be welded on to the ends. By eliminating these two operations in the new design, approximately one-third of the previous labor cost for assembly is saved.

Compression-formed tubing is cold sized by rocking semicircular taper-grooved dies back and forth over the

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ANACONDA METALS at work

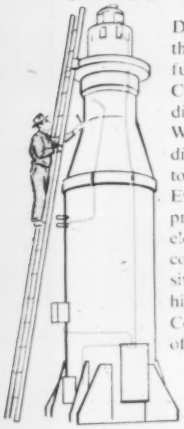
Pictures "come to life"

Ever look through an old-time stereoscope? Remember the fascination of three-dimension pictures? Now add the vivid, full-color of Kodachrome and you have an idea of the breathtaking realism made possible with a View-Master Stereoscope – price, two dollars retail – anywhere in the U.S.A. But there's a lot of close-fitting, smooth-operating brass stampings in this device, and, when they're made at the rate of a million a year, there's no time for fussing with off-gage, off-temper metal. Anaconda Brass is the choice of Sawyer's Inc., Portland, Oregon, makers of the View-Master.

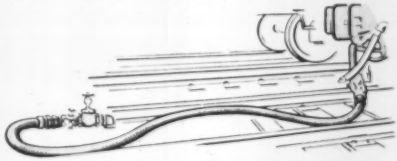
Because the cow won't cooperate

This unique milk-bottling valve features an air release tube telescoped into a second larger tube. Advantage: Fast air venting speeds up the bottle-filling operation. Anaconda Nickel Silver was selected for the most important parts because this silvery-white metal is attractive, readily workable, easy to clean – and keep clean. The Specialty Brass Company, Kenosha, Wisconsin, manufactures the Kleen-Fill Valve.

World's longest water tunnel



Driven through solid rock for 117 miles, this underground aqueduct will eliminate future water shortages in the New York City area. The new tunnel, built under the direction of the New York City Board of Water Supply, measures up to 21 feet in diameter and extends from the Catskills to New York City. Thousands of feet of Everdur Electrical Conduit are used to protect important control wiring for the electric sluice gate hoists, pumps and recording devices. Junction boxes in corrosive locations are also made of one of the high-strength, corrosion-resistant Everdur Copper-Silicon Alloys. Write for a copy of Publication E-12.

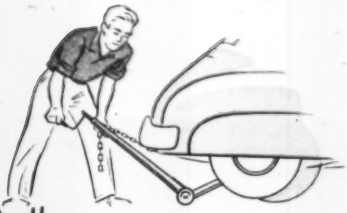


An "American" short story on railroading

Many of our railroads have found a simple, economical answer to the problem of supplying live steam to cars and coaches standing on sidings or in railroad terminals waiting for a locomotive to hook on. It's in the form of "American" Flexible Metal Tubing. No joints to repack – simple to connect and disconnect, they save dollars in steam and maintenance expense. There are thousands of other applications where "American" Flexible Metal Hose or Tubing is used to convey steam, oil, air and other liquids and gases. Catalog CC-300 tells all. Want a copy?

PS

With the rapid changeover facing American Industry today, much time can be saved by getting the right answer, quickly, to new metalworking problems. The service files of our Technical Department represent many years of experience with the metalworking field and contain much practical information on copper and copper alloy applications. If you feel we can help, don't hesitate to write, addressing The American Brass Company, Waterbury 20, Connecticut.



Jack of all cars

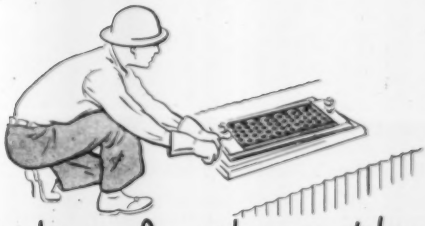
Ever have trouble changing a flat on that low-slung car of yours? Well, here's a jack that eliminates the headache. Made by the Triangle Jack Co., Inc., of Wichita, Kansas, it can be instantly adjusted to suit the road clearance of any car. An Everdur Copper-Silicon Alloy is used for an important part of the screw mechanism because the manufacturer found it stronger, tougher and generally superior to all other non-ferrous metals tried.

We do this in self-defense

For many years our French Small Tube Branch has manufactured small diameter, thin-gage tubes of the highest accuracy commercially obtainable. One of the reasons for this is the constant use of the bore telescope on redraw stock . . . for a *small* defect in a large tube would mean a *large* defect in a small tube. Since a tube with an imperfect bore could not escape our final tests and inspection, it would be rejected and scrapped . . . hence, we have a mighty good reason for ferreting out any possible imperfections right at the start.

What's so fascinating about a fire hydrant?

It all depends on the point of view. To the city engineer it's a comforting thought to know the manufacturer used the right metal in the right place. The stem, for instance, is one of the most vulnerable parts of a hydrant. It is subject to unusual stresses, strain and corrosive attack—and it has to be there when you need it! Leading hydrant manufacturers are using Everdur Copper-Silicon Alloys in increasing quantities for stems, stem-nuts, seat rings, drip valve holders, washers, bolts, barrels and other parts where a strong, tough, corrosion-resistant metal is required.



No chance for replacement here

Expansion and contraction are important problems in bridge and highway construction. A bearing surface capable of supporting the tremendous, shifting weight of the superstructure must be provided. Bridge plates of Anaconda Rolled Phosphor Bronze, one of the best bearing metals known, have been installed in many of the country's largest structures, including the Macombs Dam Bridge approach of the Major Deegan Expressway, New York City. Fabricated with graphite-lubricated inserts in trepanned grooves by Merriman Brothers, Inc., Boston, and used in conjunction with a rocker assembly, these Anaconda Bridge Plates will withstand lateral movement in any direction from now on.

YOURS—FOR THE FIRST TIME!

25 years of corrosion-resistance data ...in 24 pages

This brand new booklet is the first of its kind in the brass industry. It explains the chemical and physical nature of corrosive attack in its various forms. Included is a tabulation indicating the relative corrosion resistance of the principal types of copper and copper base alloys when in contact with 183 different corroding agents frequently encountered. A penny post card will bring your copy of Publication B-36. Address: The American Brass Company, Waterbury 20, Conn.

ANACONDA

the name to remember in

COPPER·BRASS·BRONZE

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tube, forcing the metal against a mandrel which controls inside diameter. Because the metal flows circumferentially and longitudinally in the process, the resulting tube acquires a denser, more uniform structure.

Routing Procedure Improved

An improved design of template and machine for hand routing is a development of Glenn L. Martin Co. Routing was formerly done with a hand router which was equipped with a guide 0.125-inch high. The hand router template was made from 0.125-inch material, the guide resting on the template for the operation. The operator had very little control of the hand router motor and cutter, so undercutting frequently occurred.

The new method was developed to prevent the router guide from overriding the template. Height of the guide is increased to 0.218-inch, and the thickness of the hand router template is increased from 0.218-inch to 0.250-inch. The extra height of the router guide, together with the extra height of the template, prevents overriding. Method is entirely practical, the margin of error on undercutting being minimized by this change.

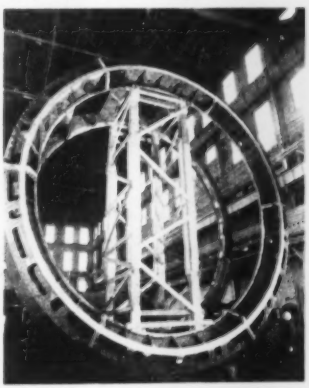
Devices Load Planes Faster

Designed to simplify and speed up air cargo handling, a portable outdoor freight elevator and in-plane mechanical stevedore were introduced at Lockheed Aircraft Corp., Burbank, Calif., at a loadability demonstration for military officers. The two pieces of loading apparatus, both powered by the plane's own electric system, can be carried right with the transport for use even at advanced landing fields where regular loading aids are unavailable.

The elevator and stevedore, a built-in-the-floor chain conveyor, make it possible in an emergency for one man singlehandedly to load an entire plane. Besides handling freight, the electric lift can be used to expedite loading and unloading of hospital-bound litter patients when fighting-zone freighters become air ambulances on return trips.

Large enough to hold many items at a time, the 10 x 10 foot elevator can raise 10,000 pounds more than 12 feet. It consists of an aluminum frame supporting strong stanchions at each corner. The elevator bed fits between the poles. Cables run up over the top of the stanchions and down, connecting to a motor and winch mounted in the rear of the frame. The prototype elevator is hydraulically powered, but future mod-

250,000-Pound Stay Ring



OUTSIDE diameter of this assembled stay ring for a Kaplan-type turbine is 37 feet 4 inches. It is for the fifth propeller-type turbine furnished for the Tennessee Valley Authority's Pickwick Landing plant by Allis-Chalmers Mfg. Co., Milwaukee. The first four were rated at 48,000 hp at 81.8 rpm under a 43-foot head and this unit plus one to follow will have the same physical size and speed but will have runners rated at 55,000 hp under 43-foot head

"Gravy ON YOUR HAIR?"

Just because gravy goes swell over noodles, he shouldn't assume it's good on hair, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

OIL CUPS permit you to lubricate each bearing with the oil best suited to that bearing—thus prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production. And oil cups fortunately *cost very little*.

Gits oil cups have been the standard for industry for more than 40 years. Gits Bros. has the largest selection of oil cups available anywhere. Call on Gits Bros. for a prompt, efficient solution to your lubrication problems.

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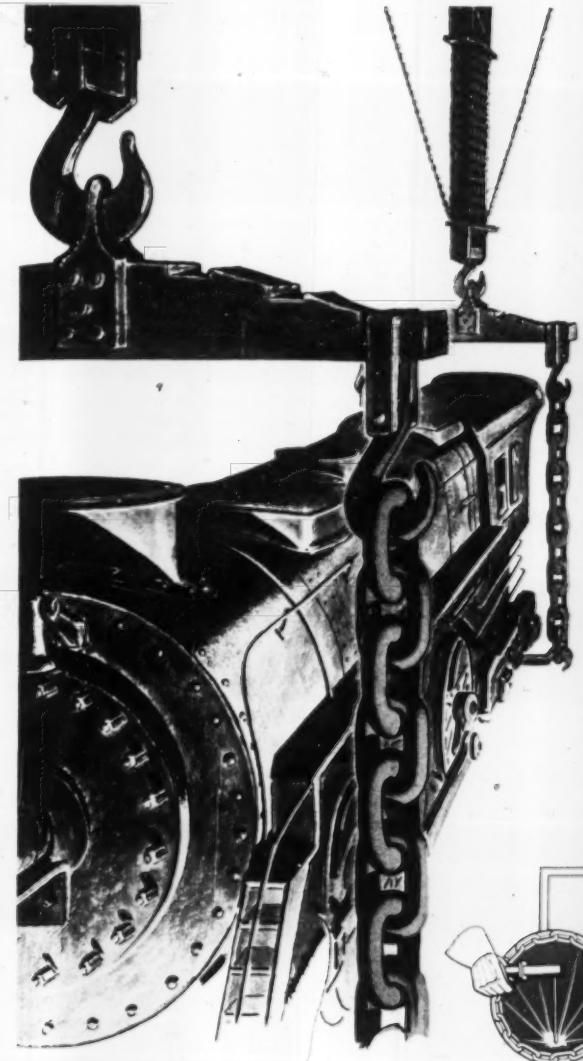

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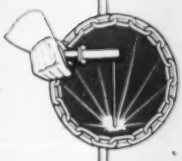
SEND for the McKay Sling-Chain Kit. It gives Sling-Chain specifications and shows how to specify sling and other chains used in plants and shops. Write today.



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KRANE KAR handles spare blooms for Blooming Mill, large slabs for Rolling Mill, charge boxes in Open Hearth, bars in Cold Drawn Bar Mill (finally loads them into railroad cars), changes rolls and bumper plates in Steel Strip Mill, and stands by to relieve heavy duty overhead cranes; transports all kinds of loads in Machine Shop, Construction and Maintenance Depts. With clamshell bucket, **KRANE KAR** moves sand in Welding and Foundry Depts., and coke in Coke Dept. *Ask for illustrated Bulletin 89—"How Metalworking Plants Reduce Materials Handling Costs."*

Gas or diesel, 12 to 37 ft. booms or adjustable telescopic booms; solid or pneumatic rubber tires. Buckets, magnets, and other accessories available.

THE ORIGINAL SWING BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER
1½, 2½, 3, AND 10 TON CAPACITIES

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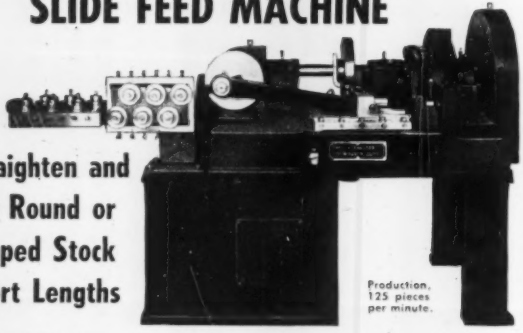


Straighten and Cut Round or Shaped Stock Short Lengths

Production, 125 pieces per minute.

Recommended wherever accuracy and a perfectly square cut are a "must." In this machine, the stock receives a shearing cut from two round dies. This method of cutting produces an accurately square cut and holds the length of cut to very close tolerances.

Capacity: ½" to 10" lengths; maximum diameter of rod, 9/16"; production, 125 pieces per minute. May be had without the 12-roll straightener if your stock is already straightened.

Detailed circulars on request. When writing please describe your set-up.

Mfd. by **METTLER MACHINE TOOL, INC.**
132R Lawrence St. New Haven, Conn.
Representatives in all principal cities and in foreign countries.

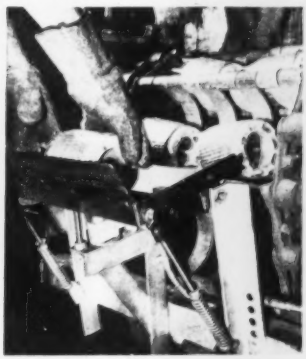
els will be electric. Raisable, flexible ramps permit carts and handtrucks to be wheeled onto the elevator and into the plane. The entire elevator unit is wheeled for moving from plane to plane. When in use, it rests on self-contained jacks.

Companion piece to the elevator, the (Aero-Trusty) stevedore conveyor, is a sub-floor endless chain running the length of the cabin. In a floor slot, a device hooked into the electrically driven chain pushes or pulls loads weighing up to 10,000 pounds. Loads slide easily along the metal floor. Portable switches on a long cable on a swivel reel attached to the ceiling permit the operator to walk beside cargo being hauled by the conveyor. All but a few small pieces of the conveyor system are removable to save weight when necessary.

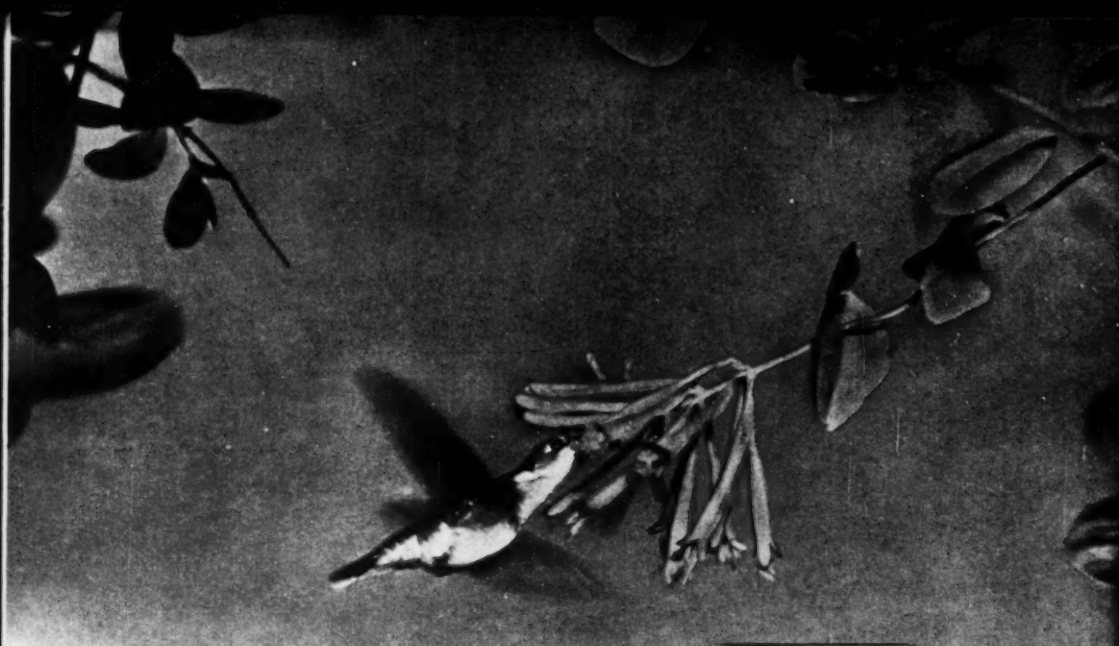
New Carbon Brush Booklet

A new two-color, 28-page booklet entitled "Carbon Brushes for Electric Equipment" is available from General Electric Co., Schenectady 5, N. Y. It describes and illustrates the fundamental consideration given to design, application, and manufacture of carbon brushes and includes a section on brush terminology. Produced to familiarize users with the physical

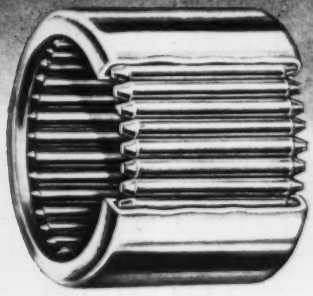
Conveyor Is Self Stopping



CONVEYOR hearth speed in electric oven at Westinghouse Electric Corp.'s works in Buffao is timed so operator at rotor core and shaft assembly station can transfer rotor to assembly fixtures while conveyor operates continuously. Rotors missed by operator roll out of conveyor pocket onto hinged shelf that depresses switch stopping conveyor motor. Switch is released and motor restarted when operator removes rotor from shelf



compact...



Torrington Needle Bearings fit in tight places. These efficient units have the smallest O.D. in relation to radial load capacity of any anti-friction bearings.

This combination of compact size and high capacity has proved an important design advantage from the standpoint of space-savings and weight reduction. Products utilizing Needle Bearings are models of simplicity and efficiency.

If *your* application requires compactness coupled with high capacity, get acquainted with Torrington Needle Bearings. We'll be glad to help you adapt them to your specific needs.

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Torrington, Conn. • South Bend 21, Ind.

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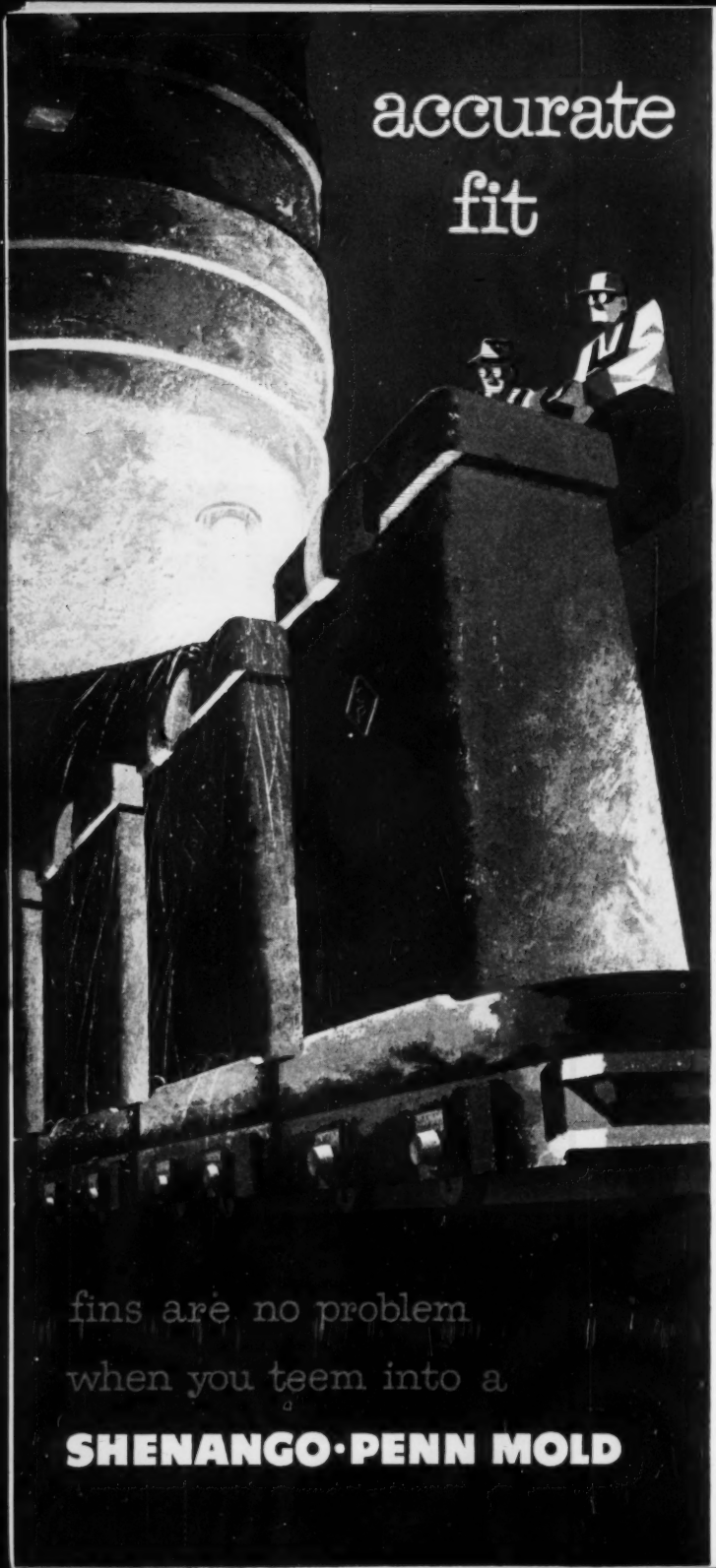
TORRINGTON *NEEDLE* BEARINGS

NEEDLE • SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • BALL • NEEDLE ROLLERS



characteristics that must be known before proper recommendation can be made for brush application, the booklet also tells of their engineering services offered to help solve specific brush problems.

Included are sections on types of brushes, characteristics of brush grades, brush grade recommendations, mechanical design of brushes, and tips on brush replacement.

New Corrosion Laboratory

Scientists in the nation's newest corrosion laboratory can simulate a tropical typhoon or a sunny day in the mountains. Opened recently at Armour Research Foundation of Illinois Institute of Technology, it will concentrate on newer, less expensive ways to combat corrosion.

Special humidity cabinets and salt spray units enable scientists to study corrosion inhibitors (rust preventers) under simulated field conditions. Insulated "hot boxes" permit laboratory men to watch corrosion take place at 160° F.

Dr. Edward Schwoegler, research organic chemist, who will supervise activities in the new laboratory states: "By developing new and improving present corrosion inhibitors, we hope to cut the nation's annual corrosion bill. This amounts to about $5.5 billion, or $37 per person annually."

New and better corrosion inhibitors are essential to the defense effort. Often, high-precision, carefully machined equipment is corroded so badly during shipment that it can never be used.

Magnet Tested at 40,000 KW

Westinghouse electrical equipment, specially designed to power the two billion electron-volt Cosmotron has successfully passed its first tests at the Brookhaven National Laboratory, Upton, N. Y. This was disclosed with the announcement by the laboratory that the 2200-ton magnet—key component of the accelerator—has been tested at its full power of 40,000 kw. Other elements are now being added and the complete machine should be ready for trial runs early next year.

Called the Cosmotron because it will give atomic particles energies equal to some cosmic rays, the giant machine is designed to accelerate protons to energies exceeding two billion electron-volts, five times greater than those provided by the largest existing cyclotron. The electrical equipment will feed power to the ring-shaped iron magnet, which measures 65 feet in diameter and which contains an acceleration chamber for the protons.

Energy is supplied by a large

"no more GAMBLING on tool steel selection"

[1/3 actual size; Selector is in 3 colors]

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!!

Crucible Steel Company of America
Dept. S, Chrysler Building
New York 17, N. Y.

Gentlemen:

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

Name _____ Title _____

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CRUCIBLE first name in special purpose steels

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fifty-one years of Fine steelmaking

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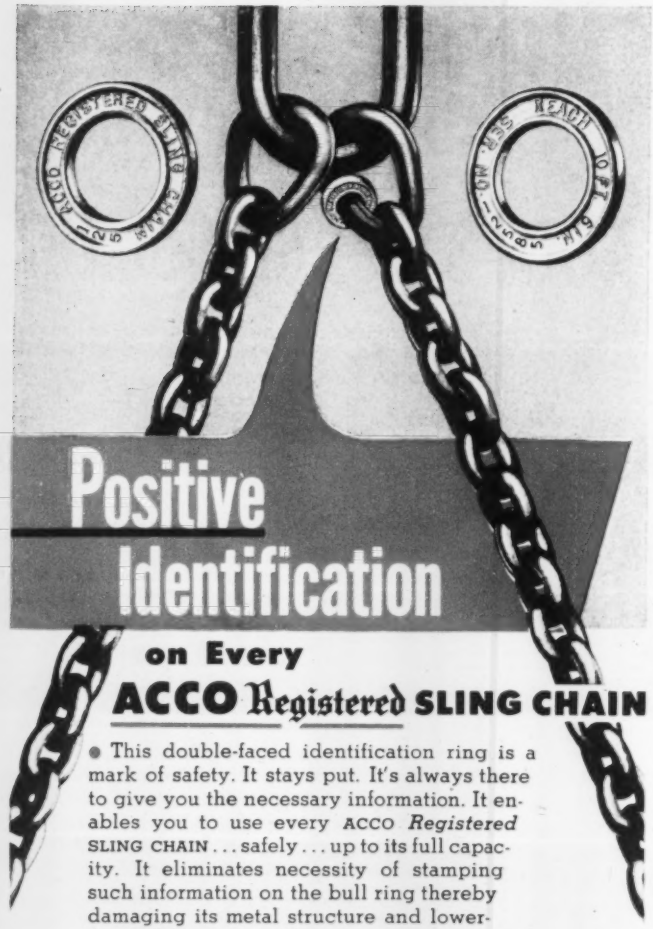

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ACCO Registered SLING CHAIN

● This double-faced identification ring is a mark of safety. It stays put. It's always there to give you the necessary information. It enables you to use every ACCO *Registered* SLING CHAIN . . . safely . . . up to its full capacity. It eliminates necessity of stamping such information on the bull ring thereby damaging its metal structure and lowering its lifting capacity.

Don't Gamble . . Don't guess that a certain sling chain will lift an expensive machine. The damage to men and material is far too costly. Select the types, sizes and materials needed for your work from the complete line of ACCO *Registered* SLING CHAINS. The positive identification ring on each one gives you assurance that the unit was rigidly inspected and fully tested. You can't buy better sling chains.

Send for your copy of **Catalog DH-80.** *It shows you how to select, use, and care for sling chains.*

"Intentionally Better" SLING CHAINS

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AMERICAN CHAIN & CABLE

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motor-generator set, equipped with a 45-ton flywheel, that delivers alternating current to a battery of 24 ignitron rectifiers which convert the alternating current into 40,000 kw direct-current pulses. Twelve pulses per minute are sent into the magnet to guide the subatomic particles around the acceleration chamber.

IBM Using Cathode Ray Storage

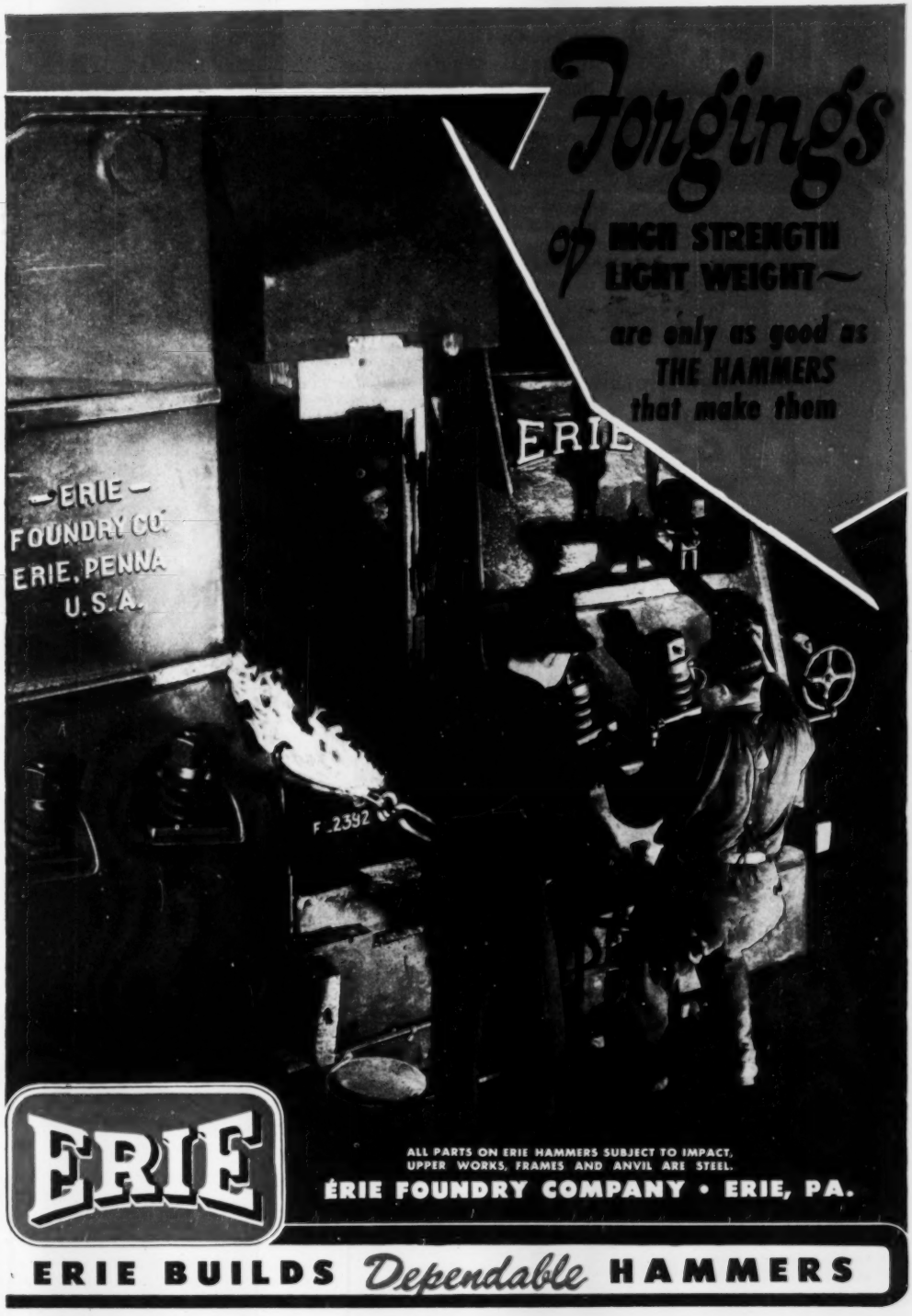
The cathode ray tube storage system developed by Prof. F. C. Williams, English radar expert, is being introduced by International Business Machines Corp., New York, into its electronic calculators. IBM will use the Williams system under a licensing agreement with the National Research Development Corp. of London. The agreement gives IBM full use throughout the world of NRDC patents in the computing field, including many involved in the new Manchester University digital computer.

In the cathode ray storage system, information required in a calculation is stored in the form of dots and dashes on the face of the tube in a manner similar to the projection of a picture on a home television tube. The information is read back from the tube to the electronic computer in a few millionths of a second, by passing the cathode ray beam over the same area. As many as 2048 items of information have been stored on a cathode ray tube with a 24-square inch screen.

Alloy Casting Research Expands

Expansion of its technical research program is being undertaken by Alloy Casting Institute, Mineola, N. Y., to help meet mounting defense mobilization needs and other engineering and equipment requirements dependent on the use of stainless steel castings. Three new projects closely keyed to current production and supply problems of the industry and its customers are being instituted at major research laboratories.

In view of the greatly increased demand for high alloy castings and the concurrent shortages of alloying elements, the technical research committee is concentrating its alloy conservation studies at Battelle Memorial Institute on the high temperature properties of the 21 per cent chromium, 10 per cent nickel type alloy. Development of titanium-stabilized corrosion resistant castings, for use in aircraft production, is to be carried out at Ohio State University. In addition, an extensive study of improved gating systems for high alloy casting production will be conducted as part of the program underway at Massachusetts Institute of Technol-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New DOUBLE PURPOSE PRESS

Now you can punch holes of various shapes as large as 4" diameter in 16 gauge steel—also blank, draw, emboss, form, — with the versatile DI-ACRO Punch. It is ideal for both experimental and production work.

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ogy, under auspices of the shop practice committee.

Hardness Data Card Offered

A pocket-size table of Brinell hardness numbers, incorporating other tabular information of importance to the metallurgist, inspector and engineer, is available from Steel City Testing Machines Inc., 8843 Livernois, Detroit 4. One side of this card sets forth the standard table of hardness numbers for a 3000 kilogram load in the range from 682 to 93.7 BHN. The approximate Rockwell C scale conversion is also given in the range from 62 to 21C.

The other side contains three tables reprinted from ASTM tentative standard E-10. One of these states the recommended Brinell load for various ranges of hardnesses. Another gives the minimum thickness of specimen which can be hardness-tested using

Circles Divided Accurately

DIVISIONS of a circle can be marked with a diamond pointed tool to an accuracy of less than 1 second by Swiss dividing engine installed at W. & L. E. Gurley, Troy, N.Y. It is one of two used by the company in the manufacture of transits and military equipment. Shock mounting of the machines assures extra accuracy and glass covers provide protection from dust. Platen has 720 teeth on its outside diameter and is operated by a single-thread worm. One revolution of the worm imparts an angular rotation of 30 minutes to the platen. The reference circle on the outer circumference of the platen is graduated every 10 minutes of arc and is read with locating microscopes

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ROUND FLAT OR SHAPED

LOW CARBON
HIGH CARBON
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SPECIAL ALLOY
ARMCO IRON

You draw the Shape —Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part. Cross-sectional areas up to .250" square; widths to 3/8"; width-to-thickness ratio not exceeding 6 to 1.

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PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

the Brinell method. Also included is the ASTM recommendation for determining the type of ball penetrator to be used with different hardness ranges.

Battery Guide Issued

Gould-National Batteries Inc., Trenton 7, N.J., announces a 56-page revised edition of its free pocket-size handbook of technical instructions and engineering data on the care of motive-power storage batteries. Major addition to the handbook is a six-page section on battery charging. Included in this section is information on modified constant voltage and two rate charging; boosts, equalizing and emergency charging; control of discharge by four different methods; automatic control of charging by both ampere-hour meter and voltage relay timer; manual control of charging by specific gravity and volt ampere methods; tips on steel-tray battery charging; and charging equipment maintenance.

A section of the handbook contains four pages on the theory of the lead-acid battery. Text gives basic information on specific gravity changes of battery electrolyte, charging and discharging cycles, positive and negative plate composition, and other battery operation principles which constitute the theoretical background upon which good care and maintenance procedures are based.

Following the theory section are four practical sections: Care and operation, maintenance and repairs, parts and technical data. The care and operation section of the Gould handbook gives instructions for receiving, placing in service, operating, maintaining and charging the storage battery. Also included in this section are suggestions for the storage and use of hydrometers and thermometers.

Copies of the new handbook can be obtained without charge by writing to the company.

Alternate Stainless Described

An illustrated booklet, "A Guide to Type 430 Stainless Steels as Alternates of the 18-8 Series," is released by Republic Steel to help manufacturers affected by defense restrictions in the use of chromium-nickel stainless steel.

The new booklet describes type 430 stainless steel and its modifications (which contain no nickel) in comparison with types 302 and 304 (now restricted due to nickel content).

Data are given concerning performance under corrosive conditions, and the mechanical properties related to

BRIGHT FINISHING SYSTEM

SPARKLES

LIKE CHROME!

Leading manufacturers approve zinc plate and IRIDITE® *Bright to replace conventional chrome plating*

If your problem is finding the right finish to replace conventional chrome plating, follow the lead of prominent manufacturers of all types of products . . . switch to zinc plate and Iridite Bright.

Here's what you get when you use this chromate finishing system to replace conventional chrome plating.

SPARKLING BRIGHT APPEARANCE

The zinc plate and Iridite Bright system resembles chrome so closely that visual inspection can scarcely tell the difference! And, the brilliance *lasts*.

BETTER CORROSION PROTECTION

Yes, you actually get better protection with zinc plate and Iridite Bright than with chrome plating . . . up to twice the life under accelerated salt spray conditions! And, by applying a clear baking lacquer over the Iridite coating you can increase the abrasion resistance and lasting qualities of this bright finishing system, at the same time making possible a greater salt spray protection.

LOWER FINISHING COSTS

One metal, zinc, replaces three so you save material costs and plating time. Iridite Bright goes on in a non-electrolytic chemical dip.

Write or call today for your copy of our new Technical Bulletin describing all phases of this bright finishing system in detail. Tell us your bright finishing requirements. If possible send sample parts for test processing.

Iridite is approved under government specifications

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Manufacturers of Iridite Finishes
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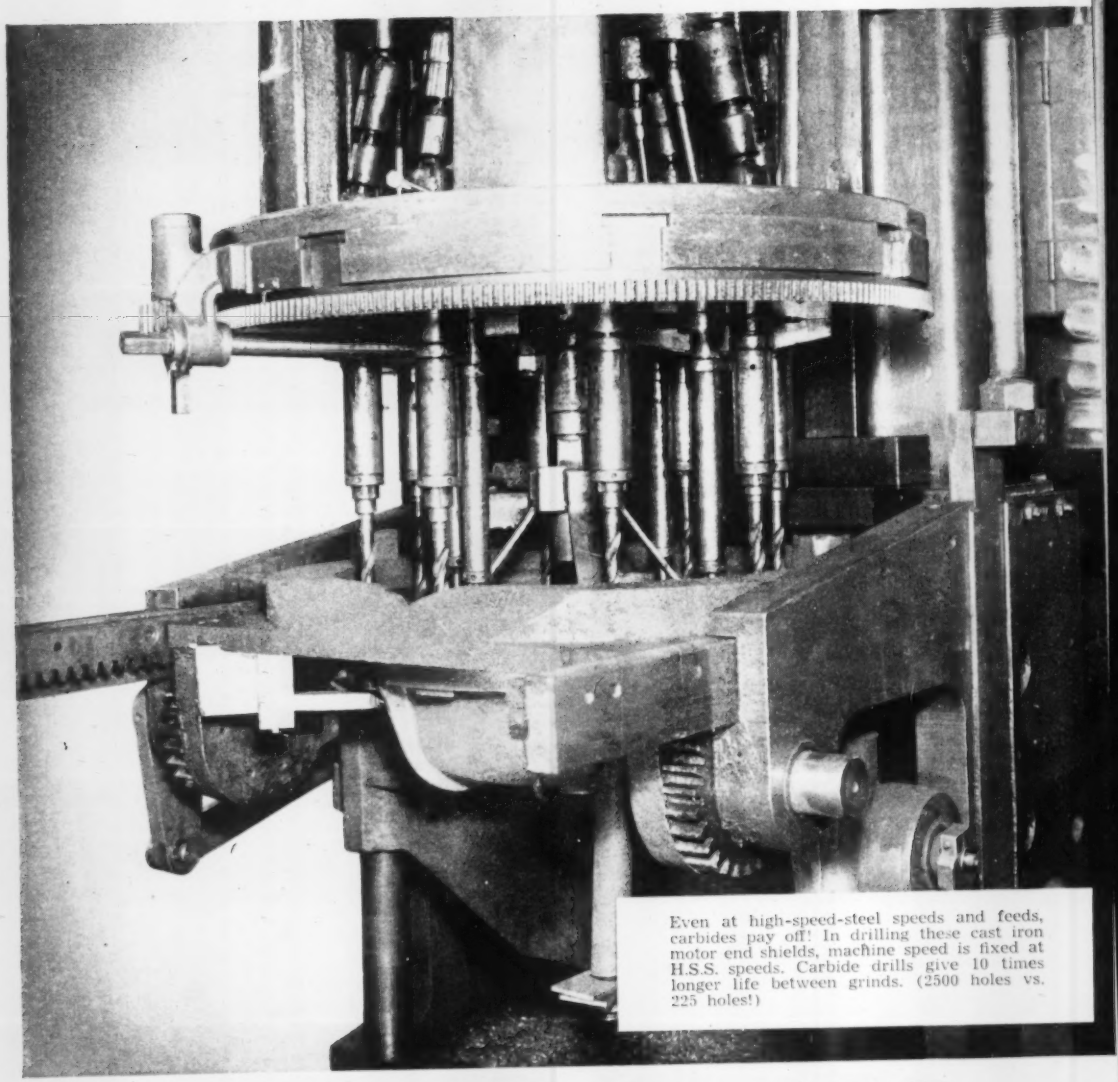
How to Drill Cast Iron



Even at high-speed-steel speeds and feeds, carbides pay off! In drilling these cast iron motor end shields, machine speed is fixed at H.S.S. speeds. Carbide drills give 10 times longer life between grinds. (2500 holes vs. 225 holes!)

*CARBOLOY®

CEMENTED CARBIDE

with Carbide Twist Drills

Send for this free data!

Exhaustive tests, as reported in the trade press, confirm what some plants have long known: Cast iron can be successfully and profitably drilled with *Carboloy Grade 44A. Sound technical data now available.

(Although the Carboloy organization does not make drills, this message is published as a service to the metalworking industry in the interests of the defense program.)

Exhaustive laboratory tests, plus actual use by many plants, show that by simply applying *basic cemented carbide principles* of use, carbide-tipped twist drills can deliver sensational results in the drilling of cast iron.

Recent articles in the trade papers demonstrate this. Users report *doubled* production . . . more than *tripled* drill life over high-speed steel drills *without* special drilling equipment or individual job engineering.

Complete data from tests and other sources have been gathered by Carboloy engineers. *Tried* and *proved* methods of proper carbide technique to speed cast-iron drilling . . . give you the same outstanding benefits in drilling cast iron that you get with cemented carbides on your other metalworking jobs.

For carbide-tipped twist drills, contact your distributor or drill manufacturer. The Carboloy organization does not make carbide twist drills . . . supplies only the high-quality cemented carbide needed for their manufacture.

However, we will be glad to supply you with the latest technical data on proper application and technique, and assist you wherever possible in applying Carboloy Cemented Carbide Grade 44A to your cast-iron drilling jobs. Send coupon for free technical data illustrated.

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY

"How to Drill Cast Iron With Carbide Twist Drills." Contains technical data on speeds and feeds, equipment, operating conditions, and other information needed for top drilling results.

Reprint of results of recent development work as reported in *Iron Age*, May 31 issue. Contains tests and practical job applications on proper use of carbide in cast-iron drilling.

FREE . . . *Latest technical data on* HOW TO DRILL CAST IRON WITH CARBIDE TWIST DRILLS

SEND COUPON TODAY FOR FREE DATA!

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Dear Sirs:

Without obligation, please send us _____ sets of reprints of technical articles on how to drill cast iron with cemented carbide twist drills.

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DETREX RECOMMENDS

SPECIFICATION	REQUIREMENT	
Grade I. Phosphate coating prior to painting.	After painting, withstand a salt spray test of 250 hours. Have a coating weight of 150 mg. minimum.	→ **Perm-Cote R—4 to 5 minutes immersion time.**
Grade II.		
Type 2. Hot alkaline clean.	Metal surface left substantially bare.	→ **Detrex alkaline cleaners.**
Type 3. Solvent clean.	Metal surface left substantially bare.	→ **Detrex degreasing solvents—Triad and Perm-A-Clor.**
Type 6. Emulsion clean.	Metal surface left substantially bare.	→ **Detrex emulsion cleaners.**

U.S. ARMY SPECIFICATION 57-0 2C 11 Dec 43

FINISHES, PROTECTIVE, FOR IRON AND STEEL PARTS

SPECIFICATION	REQUIREMENT	
Type II. Phosphate coatings.		
Class B. Rustproof coatings.	36-hr. salt spray, oiled.	→ **Perm-Cote R, 30-minute immersion. Oil: Perm-oil 83.**
	2-hr. salt spray, dry.	→ **Perm-Cote R, 30-minute immersion.**
Class C. Paint bonding.	250 hrs. salt spray after painting. Have a coating weight of 150 mg. minimum.	→ **Perm-Cote B, 4 to 5 minutes immersion time.**

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108A

DETREX Corporation

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high temperature uses. Drawing, forming, welding, and polishing of type 430 stainless steels are discussed at length, with references to the differences in these operations arising when 430 is used as an alternate for types 302 and 304. The booklet may be obtained from Republic Steel Corp., Cleveland 1.

Electronic Facilities Described

Organization and facilities available for electronic design, development, and production are described in a folder published by the Sierra Electronic group in San Carlos, Calif. Besides illustrating the newly-completed physical plant of this organization, the 8-page folder shows a number of products engineered for aeronautical research, low-frequency transmission, etc.

Supplier's Metallurgists Helpful

A great deal of time and expense can be saved, and many headaches avoided, if supplier's metallurgists are consulted before a beryllium copper alloy is specified and material ordered for a given job, says Henry S. Freynik, director of research for Riverside Metal Co., Riverside, N. J. He urges product and design engineers preparing material specifications to submit complete records of past experiences with other materials on the same or similar jobs, plus a detailed statement of manufacturing requirements. To illustrate his point, the research head cites the electron tube contact machining problem that came his way via Riverside's Keystone Watch Case Division.

In this instance, the customer specified the material, which was 0.265-inch round rod, 2 per cent standard beryllium copper alloy, (ASTM B-196) soft or solution annealed. This specification provides for material with maximum tensile strength of 85,000 psi and minimum elongation of 20 per cent. Production was started, and two serious difficulties arose almost at once. Many parts broke at base of the shank during machining when cutting tool was brought against the stock. In addition, it was found that parts that survived the turning operation without parting frequently warped out of shape during heat treating.

Both problems were overcome by simply changing the hardness specifications of the rod stock from soft to hard temper, using the same alloy. This change provided material with minimum tensile strength of 95,000 psi and a minimum of 7 per cent elongation.

After this change was effected, part

Here is *Exactly WHY* a V-Belt with CONCAVE SIDES Gives You *Longer Wear!*

To see for yourself how a V-Belt that has *concave sides* is certain to give longer wear, just make this simple test:—

Pick up any V-Belt you have at hand. Bend that belt as it bends around a pulley. As it bends, grip its sides between your fingers. Here is what will happen *everytime*.

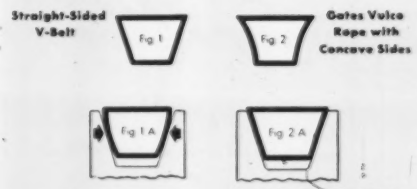
If the V-Belt you are testing has *straight sides*, you can feel those sides *bulge out* as the belt bends. This out-bulge forces the sides of the belt to press *unevenly* against the V-Pulley and you naturally get *concentrated* wear just where the bulge is greatest—as shown in figure 1-A, at right.

Now, make this same test with the belt that is built with *Concave Sides*—the Gates Vulco Rope!

Whereas you felt an *out-bulge* when you bent a belt with straight sides, you find that the *Concave Sides* merely fill out and become *perfectly straight*. The sides therefore *press evenly* against the V-Pulley. This distributes the wear *uniformly* across the *full width* of the belt. Naturally, this means longer belt life and *lower* belt *costs* for you!

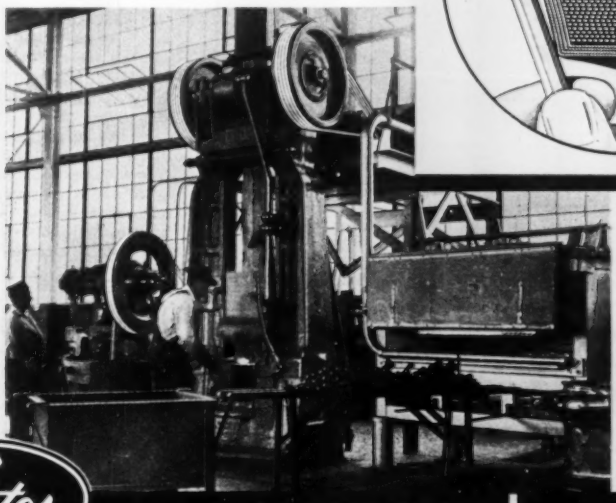
Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley — Uniform Wear — Longer Life!



This drop hammer in the plant of Kortick Manufacturing Company of San Francisco is operated by the Gates Vulco Rope Drives shown. Mr. W. H. Reiman, Plant Supt., says: "...a great improvement in the speed of the return stroke...gives us a positive drive without slip, yet one that absorbs the shock of picking up the ram repeatedly."

A CS-517

Gates®
Hose V-Belts
Molded Rubber Goods
for Industry

VULCO ROPE DRIVES
ENGINEERING OFFICES AND JOBBER STOCKS
IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY
DENVER, U. S. A.
The World's Largest Makers of V-Belts

45% gain in Electro malleable iron HIGH SPEED grinding

Electro SINCE 1918

HIGH SPEED WHEELS FOR **SNAGGING CUTTING-OFF TOOL ROOM** AND **CYLINDRICAL GRINDING** for Swing Frame, Floor Stand, Bench Stand and Portable Grinding Machines

•

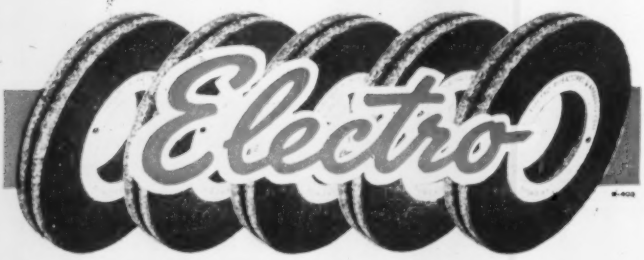
GRINDING WHEEL MANUAL 645 and Speed Calculator FREE ON REQUEST

In actual production tests under identical conditions, Electro HIGH SPEED GRINDING WHEELS removed 153 lbs. of metal while competitive wheels averaged only 105 lbs. In grinding from 24" to 20" diameter, Electro removed 6.8 lbs. of metal per cubic inch of wheel and 10.4 lbs. per hour. • This greater efficiency in Electro wheels when grinding annealed malleable castings will hold comparably with Electro Cutting-Off and all other wheels. • All we ask is opportunity to prove it in your plant, on your work and without obligation. Write, phone or wire.

ELECTRO REFRACTORIES & ABRASIVES CORPORATION

344 DELAWARE AVE., BUFFALO 2, N. Y.

WEST COAST WAREHOUSE, LOS ANGELES 58, CAL.
ELECTRIC FURNACE PLANT, P. Q., CANADA



breakage during machining was negligible, and serviceability of finished parts was actually increased, since precipitation hardening of the hard temper alloy produced finished material with minimum tensile strength of 175,000 psi as compared to the 150,000 psi tensile strength resulting when softer material was used initially.

Space Available for Subcontracts

More than 80 years of experience in the manufacturing of sheet metal products and components are outlined in a booklet issued by Penn Metal Corp. of Penna., Philadelphia. The booklet is aimed at attracting either prime or subcontracts from the government or private industry for the development and manufacture of essential products.

Illustrations show both the manufacturing facilities and machinery available and the products normally manufactured to give interested concerns an idea of the type of work the company can do. Information is furnished about the company's labor record and the key management personnel.

Chain Uses Can Be Improved

A bulletin entitled "Installation, Operation and Maintenance of Chain Drives and Conveyors" has just been published by Chain Belt Co. Of interest to all who design, install, maintain or operate chain drives and conveyors, this bulletin shows how to get the most service from sprocket chains.

It is published in the theory that no matter how excellent a chain might be in design and construction, it will not give complete satisfaction unless it is properly installed and operated; given periodical inspection, lubrication and adjustment. Request bulletin No. 51-7 from Chain Belt Co., 1600 W. Bruce St., Dept. PR, Milwaukee 4.

Weight Problems Solved Quickly

A calculator for rapidly figuring out the weight of sheet metal is being offered by Dayton Rogers Mfg. Co. Weight of any material may be found by determining the ratio of the material to that of steel.

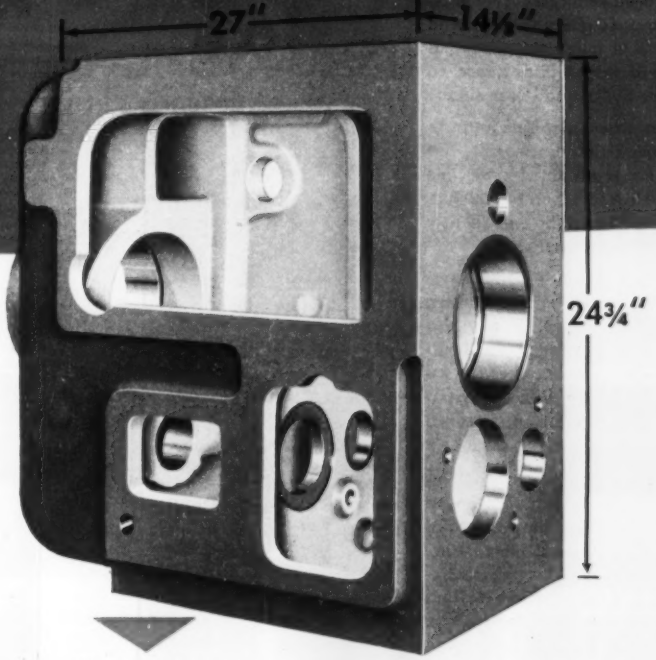
Thickness is set opposite the width and weight appears opposite the length. Small size of the calculator makes it convenient to carry in a pocket. Request should be made on company letterheads and addressed to Dayton Rogers Mfg. Co., 2824-13th Ave. S., Minneapolis 7.

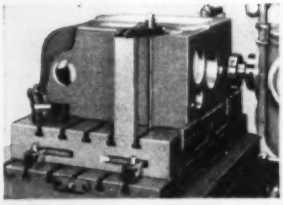
THE "JIGMIL TECHNIQUE" MAKES

JIGLESS BORING

possible on small lot production

- FAST PRODUCTION AND HIGH ACCURACY
- FLEXIBILITY OF APPLICATION FOR SMALL LOT PRODUCTION
- SUBSTANTIAL REDUCTION OF TOOLING COSTS.





This casting is processed in lots of 12 on a Model 3B Jigmil. "In Line" Bores are machined with simple Stub Boring Bars to Precise Limits of Alignment by Indexing Workpiece 180°.

Come to Detroit and Investigate the "Jigmil Technique"

Demonstrations at our Plant by Appointment

DEVLIEG MACHINE CO. DEVLIEG JIGMIL 450 FAIR AVE. FERNDALE 20 (DETROIT) MICH.

IN ONE STAGE IN ONE HOUSING

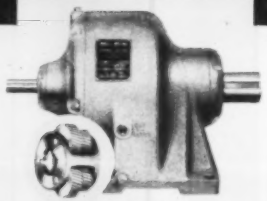
Reduction ratios of 1:1 to 50,000:1

Here's a design that is unique among speed reducers . . . *the Winsmith Patented Differential Gear.* And it's unique in many respects — all of them of major importance to machinery builder and user alike.

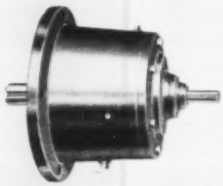
In a single stage, in one housing (which may be the horizontal, vertical or flange-mounted type), reduction ratios of 1:1 up to 50,000:1 are achieved smoothly and silently . . . *without additional parts!*

The heart of the Winsmith system is a 6-gear planetary element, free within the reducer housing to float into the most equalized load-distributing position, thereby assuring even wear, automatic compensation and alignment, smooth and quiet operation.

To be fully familiar with Winsmith Patented Differential Speed Reducers, as well as the features of the worm and helical lines, write, requesting "Save Through Standardization" Folder. It sums it all up very briefly.



HORIZONTAL TYPE
1/10 to 82 hp at 1800 rpm



FLANGE-MOUNTED TYPE
1/10 to 50 hp at 1800 rpm

VERTICAL TYPE
1/10 to 82 hp at 1800 rpm

WINFIELD H. SMITH CORPORATION
14 EATON ST.
Springville (Erie County) N. Y.

WINSMITH SPEED REDUCERS

50th WINSMITH SPEED REDUCER ANNIVERSARY 1904-1954

MEMBER OF AGMA

PATENTED

DIFFERENTIAL GEAR TYPE

CALENDAR
OF MEETINGS

August 13-15, Society of Automotive Engineers: Annual West Coast meeting, Seattle. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 20-23, American Institute of Electrical Engineers: Pacific general meeting, Multnomah Hotel, Portland, Oreg. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

August 20-24, National Association of Power Engineers Inc.: Annual meeting and exhibit, Hotel Plaza, San Antonio, Tex. Association address: 176 W. Adams St., Chicago 3. Secretary A. F. Thompson.

September 3-7, American Chemical Society: Annual meeting, Hotel Statler, Washington. Society address: 1155 16th St. NW, Washington 6. Executive secretary: Alden H. Emery.

September 4-6 Liquefied Petroleum Gas Association: Pacific Coast Convention, Fairmont Hotel, San Francisco. Association address: 11 S. La Salle St., Chicago 3. Executive vice president: Howard D. White.

September 5-7, American Hot Dip Galvanizers Association Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 2311 First National Bank Bldg., Pittsburgh. Secretary Stuart J. Swensson.

September 6-7, Rail Steel Bar Association: Semi-annual meeting, The Broadmoor, Colorado Springs, Colo. Association address: 38 S. Dearborn St., Chicago. Secretary: W. H. Jacobs.

September 8-9, New York; September 14-15, Washington—International Union of Pure and Applied Chemistry: Bi-annual meeting. Chairman, U. S. division: Prof. W. Albert Noyes Jr., University of Rochester.

September 10-13, International Congress of Pure and Applied Chemistry: New York. Chairman, U. S. division: Dr. Arthur B. Lamb, Harvard University.

September 10-14, International Foundry Congress: Brussels. Address: General Secretary, Foundry Congress, c/o Fabrimetal, 17 Draperis St., Brussels.

September 10-14, Instrument Society of America: National Instrument conference and exhibit, Sam Houston Coliseum, Houston. Society address: 921 Ridge St., Pittsburgh 12. Secretary: Richard Rimbach.

September 10-15, Annual Industrial Engineering Conference: Mechanical Department, Industrial Engineering Division, Michigan State College, E. Lansing, Mich.

September 11-13, Society of Automotive Engineers: Tractor meeting, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York. Secretary: John A. C. Warner.

September 14-16, American Society of Sanitary Engineering: National Convention, Hotel Statler, Detroit. Society address: 1307 Freemont St., McKeesport, Pa. Secretary: T. M. Dugan.

September 17-19, Allied Railway Supply Association: Fall meeting and exhibit, Hotel Sherman, Chicago. Association address: Box 5522, Chicago 80. Secretary: Charles F. Weil.

September 21-22, National Association of Waste Material Dealers Inc.: Fall meeting, Saranac Inn, Upper Saranac Lake, N. Y. Association address: 1109 Times Bldg., New York 18. Secretary: Clinton M. White.

September 24-25, Steel Founders Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland 20. Secretary: F. Kermit Donaldson.

September 24-25, American Coke & Coal Chemicals Association: Annual fall meeting, Skytop Lodge, Skytop, Pa. Institute address: 711 14th St. NW, Washington. Executive secretary: Samuel Weiss.

Neat trick for cutting oil!

You'll realize how Houghton Antisep puts "money in the bank" as soon as you start using it. Your machinists mix as much as 30 parts of plain water to one part of this all-purpose base. It will cover better than 90% of your metal-cutting jobs.

Use Antisep for general machine work . . . for automatics . . . for stamping and forming. You handle *one* instead of many cutting oils. You save space, write smaller inventories, simplify selection!

Throughout industry users are reporting good examples of Antisep's cost-cutting benefits . . .

A midwest metalworking plant reduced cutting fluid costs from 35¢ to 7½¢ per gallon . . . a well-known N.Y. manufacturer is cutting coolant costs 75% . . . a Pennsylvania plant operator reports better results at less than 1/3 of their previous oil costs . . . to mention just a few of many actual cases.

Why don't you ask the Houghton man to arrange a convincing test on your tough machining operations? Or if you prefer further information in advance, write to E. F. Houghton & Co., Philadelphia 33, Pa.

ANTISEP

ALL-PURPOSE BASE
HIGH IN ANTIWELDING PROPERTIES AND FATTY CONTENT

LATEST BULLETIN
on Houghton Antisep—showing its versatile applications—will be mailed on request.

E. F. HOUGHTON & CO.
PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO

Ready to give you on-the-job service . . .

An Important Message On CMP

It has come to our attention that some steel consumers, particularly those concerned with "B" products, have been requesting allotments from their steel suppliers or passing on to them their allotment authorizations. This is contrary to CMP regulations, and seriously delays the entire allotment procedure for you.

Therefore, in an effort to help clarify this situation, we have briefly indicated below the general procedure which should be followed in securing an allotment.

We would like to emphasize that steel warehouse distributors are not involved with the handling or issuance of allotments. When placing an order with your steel supplier, simply show your allotment number and the quarter for which the allotment is valid (Example: K-2-4Q51). Orders must also be properly certified under CMP regulations.

The General Requirements For Obtaining An Allotment

CLASS "A" PRODUCERS

1. If you are a producer of a class "A" product, you will get your allotments for controlled materials from the claimant agency (governmental), prime consumer (seller to claimant agency), or secondary consumer (seller to prime consumer) to whom you sell your product. IN EACH CASE, GO DIRECTLY TO YOUR OWN CUSTOMER FOR AN ALLOTMENT.

2. Your allotment application (Form CMP-4A) must include the amounts of controlled materials needed by your sub-contractors as well as by you.

3. You need not apply for controlled materials used for class "B" products to be incorporated in your class "A" product, since producers of class "B" products will receive their allotments direct from the NPA.

CLASS "B" PRODUCERS

1. If you are a producer of a class "B" product your application for controlled materials on Form CMP-4B must be sent to the proper industry division of NPA. You cannot obtain an allotment from any other source.

2. Your application Form CMP-4B must show all the controlled materials you need, as well as controlled materials needed by your sub-contractors producing class "A" products to be incorporated in your class "B" product.

UNITED STATES STEEL SUPPLY COMPANY

Warehouses Coast to Coast

USS

BALTIMORE · BOSTON · CHICAGO · CLEVELAND · LOS ANGELES · MILWAUKEE · MOLINE, ILL. · NEWARK
PITTSBURGH · PORTLAND, ORE. · ST. LOUIS · TWIN CITY (ST. PAUL) · SAN FRANCISCO · SEATTLE

Sales Offices: INDIANAPOLIS · KANSAS CITY, MO. · PHILADELPHIA · PHOENIX · ROCKFORD, ILL. · SALT LAKE CITY · TOLEDO · TULSA · YOUNGSTOWN

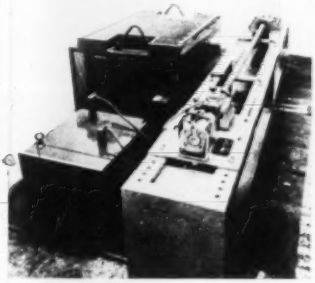
Headquarters Offices: 208 S. La Salle St.—Chicago 4, Ill.

UNITED STATES STEEL

New Products and Equipment

Torsion Bar Heat Treat

Frank C. Cheston Co., 30 Church St., New York 7, N. Y., is producing a unit for heat-treating 77-inch torsion bars for light, medium and heavy Army tanks. Units bring 1 to 2½-inch diameter bars to 1600° F in heating periods ranging from 1 minute 30 seconds to 4 minutes, eliminating diameter loss through scaling and decarburization and giving constant Rockwell readings through length of bar. They can be used for annealing bars between draws, heating for straightening bars, heating for making bolts, rivets, etc.

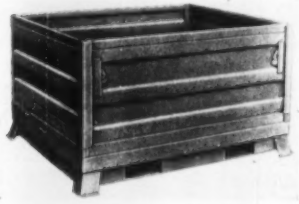


Unit will handle bars of any diameter from ⅜ to 2½ inches, any length from 4½ to 30 feet in temperature ranges from 200 to 2200° F.

Check No. 1 on Reply Card for more Details

Collapsible Dump Box

A collapsible materials handling box that can be dumped by a lift truck with a revolving apron is a development of Phillips Mine & Mill Supply Co., 2309 Jane St., Pittsburgh 3, Pa. It can be collapsed or erected in less than 20 seconds and is equipped with reinforced guide holes on all four sides for entry by the prongs of a fork lift truck.

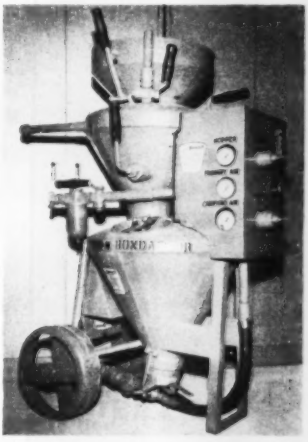


Model B-50-F has a capacity of 5000 pounds and is completely self-contained without loose pins or parts. It folds to a collapsed height of less than 10 inches, permitting several boxes to be stored in a small space. The heavy gage corrugated steel box is held in an erected position by a safety lock with a safety catch.

Check No. 2 on Reply Card for more Details

Refractory Patching Machine

A redesigned Bondact machine is available from Eastern Clay Products Inc., Jackson, O. Air placement of refractory patching materials is accomplished by ramming them into position by air pressure. This method has proved effective for cupolas as well as for open and mixing ladles.



A larger hopper provides capacity for the refractory being applied. Improved control of the pressure makes possible a more exacting control over the moisture content of the patch, resulting in a more uniform and durable lining. Gages are grouped together to simplify operations.

Check No. 3 on Reply Card for more Details

Remote Area Dust Control

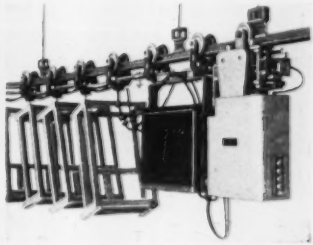
Area dust control designed to operate as a independent unit is announced by Day Co., 810 Third Ave., Minneapolis 13, Minn. Dust laden air enters at the side of the unit and spirals down to the cone outlet. As the cleaned air spirals up through the internal skimmer stack, most extra fine dust particles carried upward with the outgoing air, are concentrated by the tapered stack. Here they are skimmed off and returned to the dust outlet.

Dust control operates at 6 inches external static pressure and the fan can be discharged at any 45 degree interval. Available in four sizes from 500 to 2000 cfm, the unit can be furnished with or without secondary filters.

Check No. 4 on Reply Card for more Details

Independent Conveyor System

Bloom System Inc., 19431 W. Davison Ave., Detroit 23, Mich., announces development of an overhead conveyor system called the Mono-Dyne. Unit is battery powered eliminating the need of complicated overhead wiring. Design is such that it can be easily incorporated into present manually operated systems, making them power operated at minimum expense.

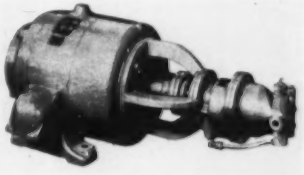


Unit is capable of multispeeds, forward and reverse, and is operated by pushbutton control or remote control. It can operate outdoors from plant to plant as well as inside and is capable of ascending grades. System may be used for production line conveying, materials handling and for the general transportation of materials and goods.

Check No. 5 on Reply Card for more Details

Compact Pumping Units

Simplification and compactness are features of the heavy-duty type HG axial rolling piston pump operating at speeds up to 1800 rpm announced by Oilgear Co., 1596A W. Pierce St., Milwaukee 4, Wis. Delivering pressures up to 3000 and 5000 psi the units are of the fixed stroke type, the volume of oil delivered varying



COULD ANYTHING BE MORE CONVINCING THAN YOUR OWN EXPERIENCE?
Then give HERC-ALLOY the toughest chain job in your plant. Our asking for this test reflects the confidence given us by HERC-ALLOY service records from industry's leading plants.
HERC-ALLOY
STEEL CHAIN

HERC-ALLOY is America's ***first alloy*** steel chain. For slings or other applications HERC-ALLOY Chain will prove that efficiency, safety and economy can go hand-in-hand.

COLUMBUS McKINNON
CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corporation)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: NEW YORK • CHICAGO • CLEVELAND • SAN FRANCISCO
Other Factories at Angola, New York, St. Catharines, Ontario and Johannesburg, S. A.

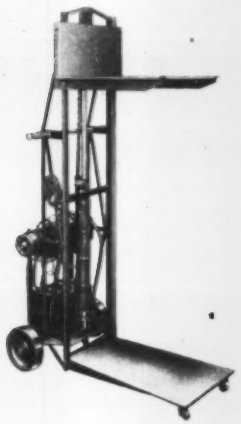
with the drive shaft speed. Oil is delivered in one direction.

Each unit consists of an axial rolling piston pump, a supercharging gear pump, a gear pump relief valve and an adjustable reverse flow type high pressure relief valve. Over 10 hp is transmitted by units 7 x 10 x 13 inches. About 135 cipm excess gear pump oil at 100 psi is available for auxiliary purposes. Pump, work and machine are protected against overload.

Check No. 6 on Reply Card for more Details

Battery Operated Stacker

Combination fork lift stacker and hand truck with elevating platform operating from a standard 6 volt automobile battery is introduced by Clark-Hopkins Equipment Corp., 1124 Spring Garden St., Philadelphia 23, Pa. It is capable of moving, lifting and stacking loads weighing up to



750 pounds. Battery activated motor mechanism operates the hydraulic lift and the built-in charger replaces battery drain during off-hours.

The stacker has a platform 18 x 21 inches wide as standard equipment. Large load wheels in the back and swivel casters at the front make it highly maneuverable.

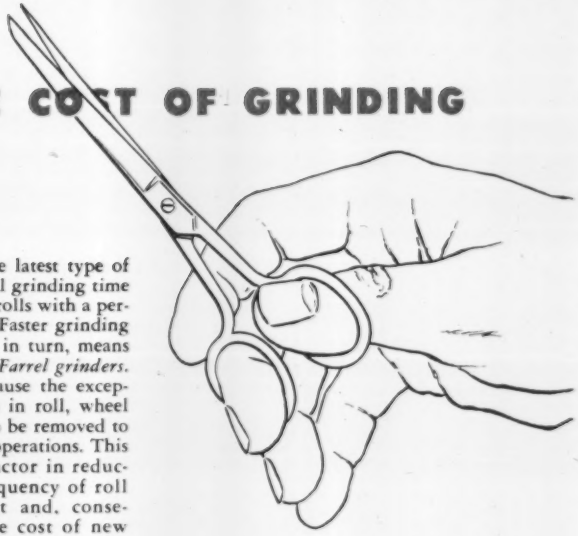
Check No. 7 on Reply Card for more Details

Small But Powerful

Model 3600 tractor is added to its line of material handling equipment by Kalamazoo Mfg. Co., Kalamazoo 24, Mich. Tractor is powered with a 13 hp Wisconsin engine through an automotive type clutch and three speed and reverse transmission.

As many as ten loaded trailers can be pulled by the tractor, and a load-

YOU CUT THE COST OF GRINDING



Reports from users indicate that with the latest type of Farrel machines they are able to reduce roll grinding time substantially, and at the same time obtain rolls with a perfect surface free from marks of any kind. Faster grinding means less labor per roll ground, which, in turn, means *you cut the cost of grinding when you use Farrel grinders.*

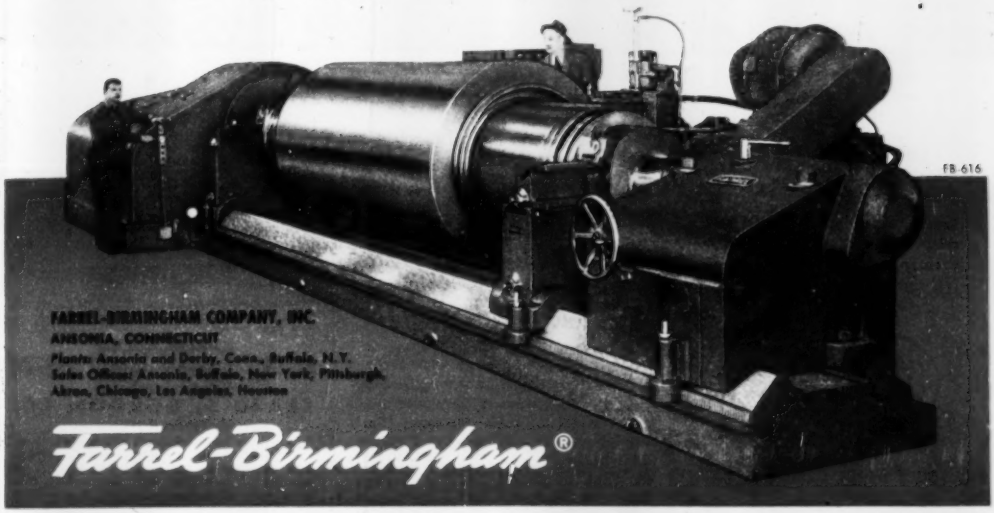
In addition, your rolls last longer because the exceptionally smooth and vibration-free action in roll, wheel and traverse drives means less metal has to be removed to clean up a roll in roughing and finishing operations. This is a vital factor in reducing the frequency of roll replacement and, consequently, the cost of new rolls. While the amount saved varies with individual conditions, it represents, in any case, an appreciable return on the investment in a Farrel grinder.

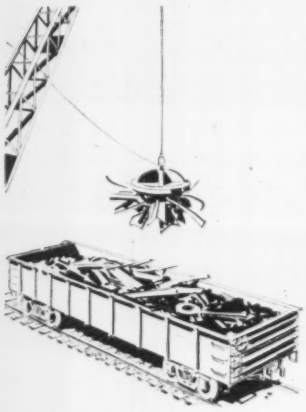
Write for Bulletin No. 115 which describes this *cost-saving* machine in detail. A copy of this 28-page bulletin will be sent to you without cost or obligation.

when you use Farrel Roll Grinders

FARREL ROLLING MILL MACHINERY

Rolls • Rolling Mills • Rod Mill Tables and Manipulating Equipment • Universal Mill Spindles • Rod Coilers • Gears • Mill Pinions • Pinion Stands • Gear Drives of Any Capacity • Flexible Couplings • Roll Grinding Machines • Roll Calipers • Lead Presses for Pipe or Rod


FB-616
FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo, N.Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Chicago, Los Angeles, Houston
Farrel-Birmingham®



HOW TO MAKE SILVER AND STEEL FROM RUSTY IRON...

Rusty iron, outdated and idle dies and machinery, production scrap . . . they're all good for dollars when you sell them to your scrapmetal dealer.

What's more . . . they help make more steel . . . and you know how tight the steel supply is today. Every ton of scrap you turn in helps make 2 tons of new steel.

Tell your department heads *today* to gather up the scrap in their sections . . . get idle and obsolete machinery out of the dark corners and on its way to the scrap dealers . . . return production scrap and shearings promptly.

Look in the yellow pages of your telephone book for the name of a scrap dealer . . . he's paying top prices for good scrap.

REPUBLIC STEEL

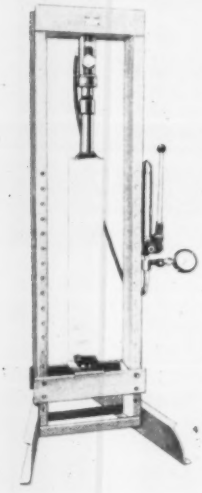
REPUBLIC STEEL CORPORATION
General Offices • Cleveland 1, Ohio

ing space of 11 square feet on the tractor itself can be utilized for additional material. Maximum speed of the truck is 10 mph. Overall length is 79 inches and overall width is 42 inches.

Check No. 8 on Reply Card for more Details

Arbor Press Mounts Buffs

A hand operated 20-ton hydraulic arbor press is being introduced by Clair Mfg. Co., 1019 S. Union St., Olean, N. Y. It was developed for mounting buff and polishing spindles for Clair surface finishing machines, but is also suitable for additional operations such as broaching, assembling, straightening, bending, etc.



In the buff mounting operation illustrated, a hollow ram extension slips over the polishing spindle to exert pressure downwards on the polishing buffs. Table can be adjusted to any desired height for other types of operations. Offering a ram travel of 5 inches, the design permits the pump and ram to be removed from the steel framework and used throughout the plant as a portable unit. Dimensions inside the framework are 17¼ x 60 inches.

Check No. 9 on Reply Card for more Details

Operation Simplified

Mounting the fingertip control lever on the steering column simplifies operation of the electric Carloader made by Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. This makes possible the selection of direction of travel and the engagement of the first point of power si-

Precision Quality!

Immediate Shipment

GORDON THERMOCOUPLE EXTENSION LEAD WIRE

The precision quality of Gordon Thermocouple Extension Lead Wire is the result of continued experience since 1915 in careful selection and inspection that meets rigid insulation requirements and Bureau of Standards specifications.

Gordon's Chicago and Cleveland plants carry complete stocks of Thermocouple Extension Lead Wire for practically every application. (See illustrations below.) These are good reasons why your order gets immediate delivery of a QUALITY product. ORDER NOW! No delays. Prices available on request.

CHROMEL-ALUMEL, Cat. No. 1231(3-A), 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

FOR PLATINUM THERMOCOUPLES. Cat. No. 1225, 16 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

CHROMEL-ALUMEL, Cat. No. 1234, 14 ga., SOLID-DUPLEX, each wire enamel, felted asbestos, Asbestos-yarn braid overall.

IRON-CONSTANTAN, Cat. No. 1236-C, 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

COPPER-CONSTANTAN, Cat. No. 1235-A, 14 ga., SOLID-DUPLEX, each wire cotton, rubber, weatherproof braid, lead sheath overall.

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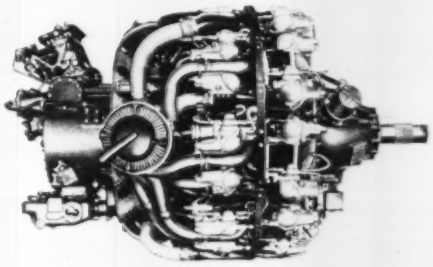
Enduro®

HELPS HARNESS THE "CYCLONE"



• Each new Wright 18-compound "Turbo-Cyclone" aircraft engine puts 3250 horsepower roaring into action. Helping convert that tremendous power into flashing aircraft performance is this turbine shaft, precisely machined from ENDURO Stainless Steel.

ENDURO serves the aircraft power plant designer and producer well. Free-machining ENDURO bars—both hot rolled and cold drawn—economically pair exceptional resistance to heat, abrasion and corrosion with great strength and durability.

ENDURO responds readily to forging. As this shaft indicates, it is readily machinable. Two ENDURO grades, for example, are fully 90% as machinable as Bessemer screw stock. In cold finished bar form, ENDURO provides close tolerances, accuracy of section, uniform soundness, and fine surface finish.

Need help in harnessing too-high machining costs in your own stainless steel parts? The combination of free-machining ENDURO and competent Republic metallurgical help has held costs down for many a manufacturer. Write:

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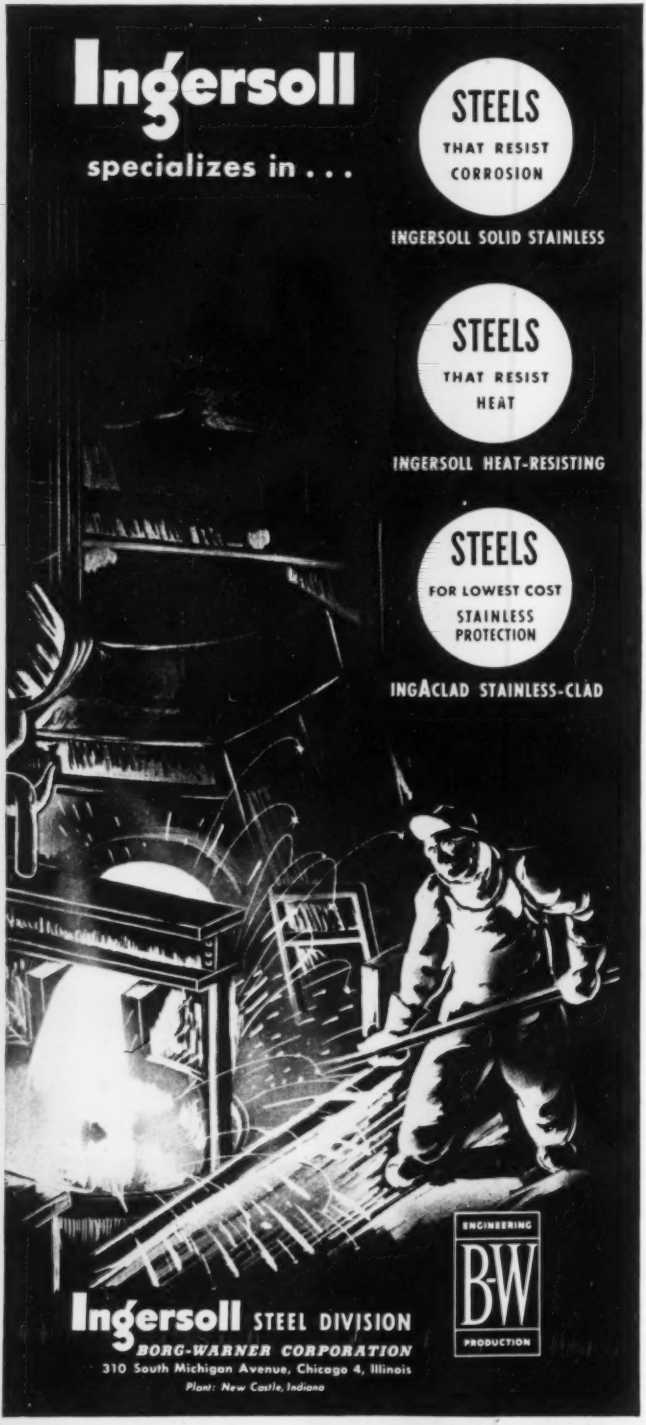
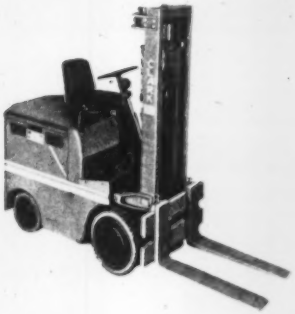
STAINLESS STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing



multaneously. Automatic acceleration eliminates jerky movement. Steering is made easier by means of the no-kick-back steering axle which is pivoted on rubber torsional bearings. Deadman brake linked to the driver's seat and operating off the drive shaft of the drive motor is set automatically the instant the seat is unoccupied.

Battery compartment is redesigned for greater convenience. Top cover is hinged at center to permit charging and servicing battery without removal from the truck, and is quickly removed so battery can be lifted out. Either or both side louvers may be removed, in order to slide the battery out either side of the machine. Standard equipment includes cushion ties and cushion seat with backrest. Model 4024 has a 4000-pound capacity and model 5024 has a 5000-pound capacity.



Check No. 10 on Reply Card for more Details

Core Rod Saved

Foundry operators can use the same core rods and gaggers several times by using the core rod straightener and shear machine made by American Wheelabrator & Equipment Corp., Mishawaka, Ind. The machine will operate as fast as material can be fed into it and labor savings of 50 per cent or more are possible. Two heavy steel dies, one movable and the other stationary, straighten one rod at a time. The dies close as a contracting square upon the work and straighten it by a blow delivered simultaneously on four sides. Big kinks in rods can be quickly removed first in the bending jaws of the machine.

Machines are available in four sizes and rods from $\frac{3}{8}$ to $2\frac{1}{2}$ inches in diameter can be straightened in the dies, rods up to $1\frac{1}{2}$ inches in diameter can be sheared. A special gagger-forming attachment is available on the machines as optional equipment. It is built to accommodate rods

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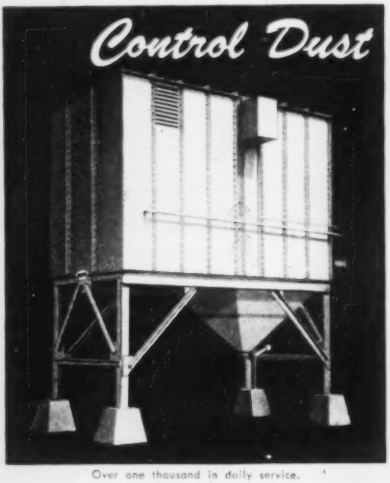

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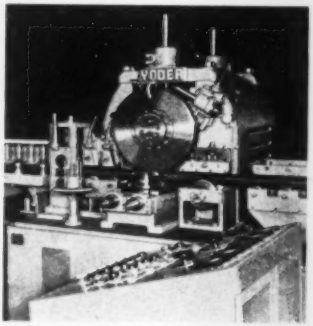
A 5881-15R

up to ⅝-inch diameter and makes a right-angle bend in one operation. Compressed air at a minimum pressure of 90 psi will efficiently operate the machine.

Check No. 11 on Reply Card for more Details

Efficient Tube Welding

Tube welder developed by Yoder Co., 5500 Walworth Ave., Cleveland 2, O., combines higher electrical efficiency with mechanical improvements. It will handle tube sizes ranging from ¼-inch up to the large sizes required for oil country goods and similar uses



and can be supplied in power capacities from 50 kva to any size desired by the customer.

Outstanding feature of the welder is the transformer which actually consists of four smaller transformers arranged in the form of an offset cross. A single core is enveloped by the four transformers so that the flux patterns in the four sections are identical. This design reduces the impedence to such an extent that one of the new transformers will have a percentage of impedence as low as that of a transformer one-quarter as large. Advantages for the user are lower power cost and higher production speed from a welder of a given capacity rating while staying within the rating of the unit.

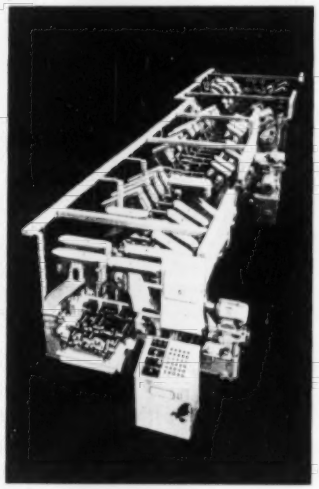
Check No. 12 on Reply Card for more Details

Drills and Lightens Crankshafts

A 43-station, automatic transfer machine featuring auto-sequencing control has been built by Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich., for drilling all oil passages and lightening holes in cast iron alloy crankshafts. Machine has a production capacity of 74 pieces an hour at 100 per cent or 52 pieces an hour at 70 per cent efficiency.

Crankshafts are automatically positioned and clamped hydraulically

prior to drilling at each station. Indexing throughout the work cycle is accomplished automatically by a hydraulic transfer-type unit. Holes are blown out and automatically inspected at the last station. High speed steel tools revolve at 40 fpm



with a feed of 0.008-inch per revolution on lightening holes and controlled feed on oil passages. Drills for oil holes are mounted in keyless, hand-operated chucks. Stroke is 16 inches station to station.

Check No. 13 on Reply Card for more Details

Chuck for Angle, Snake Drilling

Ritmar Co., Long Island, N. Y., introduces a new chuck for angle and snake drilling. It consists of two pieces, the chuck which is slotted to grip the drill and has two protrusions that prevent drill from turning and the chuck lock adapter with female threads at one end that fit the chuck to lock the drill in place. Chucks are made for broken drills or regular drills with short shanks.

Check No. 14 on Reply Card for more Details

Quick Action Clamps

Four new heavy capacity quick action clamps are offered by Lapeer Mfg. Co., Lapeer, Mich. Model CAV-1200 has recommended force of 1200 pounds at end of toggle bar and 2550 pounds with spindle located 3⅛-inch from front of base. Model CAV-2000 has recommended force of 2000 pounds at end of toggle bar, 4150 pounds with spindle 3¼-inch from front of base. Models CAS-1200 and CAS-2000 are like those mentioned,

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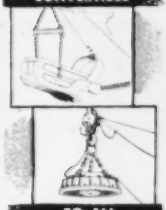

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Built by modern precision methods, the UNIT 1520 leads the field in quality, and dependable performance. Designed for both "on and off" highway operation. So compact, it works efficiently even in small, cramped quarters, "in or out" of the yard.

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- Hook Roller Construction
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- Powered by ONE Engine
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UNIT 1520 can be equipped with retractable high A-Frame to permit capacity loads on extended boom at long radius.

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but have advantage of pemitting toggle bar to swivel around base to any position within 180 degrees.

Check No. 15 on Reply Card for more Details

Sleeve Bolt Fastener

When using the new expansion sleeve-type fastener made by Square Tool & Die Co., Chicago 22, Ill., the bolt is inserted in the hole and a pneumatic tool drives bolt through sleeve and expands six prongs at bottom of sleeve. This forms a tight grip which vibration cannot work loose. Bolt head automatically countersinks itself below wood surface. The fastener is made in sizes from ¼ to 1-inch diameter with hex, square, round, flat or slotted heads.

Check No. 16 on Reply Card for more Details

Two-Jawed Drill Chuck

A two-jawed drill chuck is available from Westcott Chuck Co., Oneida, N. Y., in three sizes: No. 119-3, capacity 0 to ½-inch; No. 119-5, capacity 0 to ¾-inch; No. 119-6, capacity 0 to 1-inch.

Check No. 17 on Reply Card for more Details

Micrometer with Rounded Anvil

No. 211 micrometer, made by L. S. Starrett Co., Athol, Mass., has a rounded anvil and can be used for measuring wall thickness of bearings, tubing and various cylinders having walls up to 1 inch thick and any diameter down to ⅝-inch ID. Graduations are quick reading with every thousandth numbered. A complete table of decimal equivalents is stamped on the thimble.

Check No. 18 on Reply Card for more Details

Rubber Frame Goggle

Designed to provide a gas-tight seal and recommended specifically for gas, fume or smoke hazards, is the new rubber frame goggle introduced by American Optical Co., Southbridge, Mass. No. 701 goggle is constructed without any ventilation slots in the rubber frame to prevent infiltration of air. It may be obtained in combination with the company's R2000 or R5000 respirators.

Check No. 19 on Reply Card for more Details

Masonry Drill Bit

Cyclo-Core carbide tipped drill bit for precision drilling in hard masonry materials using a rotary type drill with pressure applied for holes ¾-inch diameter and up is announced by New England Carbide Tool Co. Inc., Cambridge 39, Mass. When inserted, the Cyclo-Center locates and starts a hole. As soon as hole is spotted, it is removed. Machined-in spiral threads running the full length of the body make automatic runways for removing dust from the hole as it is cut.

Check No. 20 on Reply Card for more Details

Synthetic Rubber Flooring

A new synthetic rubber flooring is available from Flash-Stone Co., Philadelphia 44, Pa. It has high resistance to acids, alkalis, water and other destructive agents Known as Vulcrete, it dries to a light concrete color, and bonds inseparably without need for preliminary bonding with wood, metal, concrete, and similar bases.

Check No. 21 on Reply Card for more Details

Sealing Antirust Paint

PCA-100, a new penetrating and sealing antirust paint that can be applied over rusted surfaces, is announced by Paint Corp. of America, Cleveland 14, O. Suitable for both interior and exterior use, it is also effective in preventing rust on new metal. It should be used solely as a finish coat. PCA-101 is a clear paint, equally effective for rust prevention and can be painted over with any standard paint.

Check No. 22 on Reply Card for more Details

Core Binder Resin

Designated as G-E 12353, an improved liquid phenolic core binder resin formulated to meet foundry requirements, is available from General Electric Co., Pittsfield, Mass. It permits the molding of stronger sand cores and through its use, baking cycles are reduced.

Check No. 23 on Reply Card for more Details

Axial Face Mill

Style MF Kennamill, introduced by Kennametal Inc., Latrobe, Pa., has wedged-in solid Kennametal blades and structural features that make possible the removal of cast iron at from 60 to 70 inches of table travel per minute. Blades are available in two styles, for cutting to a square shoulder or to a 45-degree corner. Mill is made in seven cutting diameters: 6, 8, 10, 12, 14, 16 and 18 inches, either right or left hand.

Check No. 24 on Reply Card for more Details

Low Pressure Cylinder

LP cylinders, developed by Hanna Engineering Works, Chicago, Ill., feature a cork floater ring that facilitates cushion alignment with head and insures a seal during cushioning; spring-backed chevron rod packings which are self-adjusting for consistently correct compression and flange design that permits removal of front head without disturbing mounting. Units are designed for operation up to 110 psi.

Check No. 25 on Reply Card for more Details

Mild Abrasive Finishing

Cocob, corn cob product, is offered by Agri-Indus Mfg. Co., Columbus 15, O., for use as an abrasive, burnisher, polisher, filler, etc. It is dust free, free from metallic inclusions, resin and acid free, nonstaining. It is ground to Nos. 10, 20, 40 and 60 mesh and can also be ground to specifications.

Check No. 26 on Reply Card for more Details

For Nut Running Jobs

Known as size 34U, a new heavy duty universal electric Impactool for nut running jobs in industrial maintenance, is introduced by Ingersoll-Rand Co., Phillipsburg, N. J. It has a 1-inch square driver and is rated for bolts up to 1¼-inch size.

Check No. 27 on Reply Card for more Details

Drills Concrete

Tilden Tool Mfg. Co., San Clemente, Calif., offers rotary Konkrete Kore drills that drill concrete at 2 to 6 inches per minute. The exhaust slot allows pulverized core particles to escape, eliminating packing and overheating. Drills can be resharpened on any ordinary grinder used for tungsten carbide.

Check No. 28 on Reply Card for more Details

Running Time Recorders

A new line of running-time recorders is announced by Bristol Co., Waterbury 20, Conn. They record on a chart the operating or "on" time of production machinery and other similar equipment in hours, minutes and seconds for a given period. Time off periods are also shown on the chart as well as the time at which they occurred.

Check No. 29 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

73. Pipe Coupling
Naylor Pipe Co.—Illustrated folder describes low-pressure Wedge-Lock coupling designed for connecting light-weight pipe in ventilating and similar low-pressure service. Data includes complete specifications on welded spiral pipe sizes in diameters from 8 to 30 in.

74. Blade Grinders
Peerless Machine Co.—8-page bulletin 60A offers complete information on Tru-Tooth blade grinders for grinding metal-cutting, power-hack and band saw type blades. Illustrations give close-up views of machine's operation and of various metal cutting power saws. Dimensions and specifications are given.

75. Oil Valve
Hauck Mfg. Co.—4-page illustrated catalog No. 704A describes and presents specifications of Micro-Cam oil valve which eliminates guesswork in oil burning by accurately regulating oil flow to any type of burner.

76. Disk Clutch
Wichita Falls Foundry & Machine Co.—2-page illustrated folder No. 101 gives description and includes cross sectional diagrams of air-tube disk clutch. A capacity table, dimensional drawing and specifications are included as well as an exploded view showing all parts.

77. Flooring Problems
Stonhard Co.—"Over the Rough Spots" is title of 32-page pocket-size booklet which presents an analysis of typical flooring problems. Graphically illustrated, it tells where to look for and how to correct bad floor conditions, how to protect both concrete and wood floorings and maintain proper repair by comparatively unskilled workmen.

78. Plant Control
Visi-Trol Corp.—4-page bulletin No. 159-3 entitled "Look at the Facts Instead of for Them," shows how visual control boards may be used to visualize production operating effectiveness at a glance. Examples of typical applications are given.

79. Smelting Furnace
Pittsburgh Lectromelt Furnace Corp.—62-page Catalog No. 8 gives pictorial and descriptive information on Moore Rapid Lectromelt furnaces for melting and refining of iron, steel, nickel and copper. Catalog discusses standard sizes of furnaces and gives data and specifications relative to each.

80. Strip Chart Recorder
Minneapolis-Honeywell Regulator Co., Brown Instruments Div.—4-page illustrated instrumentation data sheet No. 10.0-5 explains how ElectroniK Function Plotter records continuous relationship of two variables on strip type chart. Applications are listed.

81. Cupola Operation
Whiting Corp.—"How To Make Your Cupola Operation More Efficient" is title of 6-page illustrated bulletin No. FO-1. It presents answers to today's problems in light of present material and manpower shortages and gives suggestions on lighting the bed, blast control, refractories, charging, carbon control, hot blast, duplexing and other items.

82. Gear Hobber
Hamilton Tool Co.—6-page illustrated supplement H 1-49 gives information on hob speed, indexing and helix change gears; arrangement for bevel gear hobbing; and work holding fixture for use with No. 1 precision gear hobber.

83. Grinders and Arbors
Poly Products — Information on complete line of ball bearing bench grinders, arbors, sanding disks and face plates is found in 8-page illustrated catalog. Application suggestions for using saw and adapter arbors to build variety of special production tools, plus specifications and dimensional diagrams are offered.

84. Lift Trucks & Accessories
Towmotor Corp.—Illustrated folder DM-2 "Towmotor-ize for Versatility" shows how use of fork lift trucks cuts labor costs, speeds production and saves space and time. Fourteen special-purpose accessories for Towmotor trucks have application in handling wide variety of products.

85. Spot Welding
Ampco Metal Inc.—8½ x 11-in. reference chart gives recommended schedules for spot welding low carbon steel. It is punched to fit any three-ring binder.

86. Hydraulic Excavators
Badger Machine Co.—Line of Hopto hydraulically operated, truck mounted excavators, cranes and shovels are shown in 2-page bulletin No. 19512. Pictures, specifications and descriptions are included.

87. Steam Heating
Sarco Co.—8-page booklet No. 2171 presents helpful information regarding the efficient use of steam to those in industrial and heating fields. Material consists of 16 questions and answers written in easy-to-read style.

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88. Rust-Preventive Wrapping

Angier Corp.—22-page illustrated brochure "Industrial Applications" presents advantages and uses of VPI (Vapor Phase Inhibitor) wrapping for protecting packaged metal products in shipment or storage. Testimonials of various companies using this corrosion-preventive wrapping are offered.

89. Welding Electrodes

Raven Steel & Tool Co., sole American agents for Bohler Bros. & Co., Ltd. of Austria—44-page illustrated catalog "High Grade Welding Electrodes" presents complete data including applications and properties of weld for line of gas welding rods, and coated and cored electric arc welding electrodes. Comparison of consumptions, weights, wire gages, testing load conversion table and decimal equivalents are given.

90. Air-Cooled Engines

Wisconsin Motor Corp.—Many uses of heavy duty air cooled gasoline engines are illustrated in this 8-page brochure, form S-130. Power curves, specifications, dimensions and general information are given for single cylinder 3 to 9-hp and two and four-cylinder 7 to 30-hp engines.

91. Precision Stamping

WLS Stamping Co.—4-page illustrated bulletin details Speedtooling method of producing precision stampings with extremely low tool charges. Forty parts made by process, advantageous for short runs, are shown, along with drawings with dimensions.

92. Stainless Brazing Alloy

Wall Colmonoy Corp. — Physical properties, brazing procedures and uses of Nicrobraz heat and corrosion resistant stainless alloy for brazing stainless steel are covered in Colmonoy special bulletin No. 3-B. Material flows readily at 1900° F in pure dry hydrogen atmosphere and has Rockwell C hardness of about 60 before brazing. It is resistant to organic and inorganic acids.

93. Fastening Devices

Standard Pressed Steel Co.—Detailed information regarding socket head cap; self-locking socket set; flat head socket cap and square head set screws; socket set screw points; shoulder screws or stripper bolts; Dryseal-Thread pressure plugs; socket screw keys; and precision ground dowel pins is given in illustrated booklet "Unbrako Standards".

94. Air Controls

Bendix-Westinghouse Automotive Air Brake Co.—14-page illustrated catalog presents dimensional diagrams and brief descriptions of Robotair industrial air controls. Items covered include Robotair chambers; valves of the 2 and 3-way, H.P., quick release, pressure reducing, relay and single check types; gages and reservoirs; and connector, tee and elbow fittings.

95. Metal Working Machines

Ajax Manufacturing Co. — "Hot Metal Working Machines" is title of booklet which binds together bulletins 64, 65C, 75B, 91A and 111 on clutch operated bolt heading and forging machines, forging machines, forging presses, forging rolls and wire drawers. Illustrations, specifications and applications are given.

96. Investment Castings

Hitchiner Mfg. Co.—6-page illustrated folder "There Is One Right Way to Form These Parts" outlines advantages of making parts by the investment casting process. Information on comparative price, tooling, making small and large quantities, complex shapes, size limitations, finish, tolerances, material choice, physical properties and design is presented.

97. Heat Processing Machines

Selas Corp. of America—Importance of heat processing machines as automatically controlled precision tools is outlined in 16-page illustrated bulletin S-6.3 "Precision Tools for Production." Descriptions include metal brazing, selective hardening, heating for forging, tinplate fusion, melting and normalizing.

98. Metal Turnings Crusher

American Pulverizer Co. — How premium prices can be obtained for scrap metal turnings and how cutting oil can be recovered are explained in 8-page illustrated bulletin "American Rolling Ring Metal Turnings Crushers." In addition to technical data on capacities, speeds, power, foundations and operation, case histories are cited for various users of metal turnings crushers.

99. Machine Centers

Scully-Jones & Co.—4-page illustrated bulletin No. 9-50 presents general information and specifications of live, solid high speed steel, tungsten carbide tipped and Stellite tipped centers.

100. Brass & Bronze Alloys

Titan Metal Mfg. Co.—Installation of Quantometer direct-reading spectrometer for obtaining accurate analyses of brass and bronze alloys is described in 8-page Illustrated bulletin "Control". Also detailed are other modern control methods used in production and fabrication of Titan brass and bronze rods, forgings, die castings, welding rods and wire.

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13	33	53	73	93
14	34	54	74	94
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Machine tool production increased through constant removal of chips, turnings and borings.

Eliminates shut-down and reduces waste handling.

The CHIP-TOTE conveyor continuously removes wet or dry chips, turnings and borings from multiple-spindle or automatic machines. Speed of operation can be synchronized with the metal-removing capacity of any standard or special machine.

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Today the nation urgently needs 10,000 new freight cars a month. This is just one reason why there is less steel for civilian products.

While the pressing needs of our rearmament program are being met, western manufacturers are still getting steel for civilian requirements.

This is due in part to Kaiser Steel's continuous expansion to meet the needs of western industry. The program has included the construction of a second blast furnace, doubling the pig iron capacity of the Pacific Coast; the building of additional coke ovens and two more open hearth furnaces; the acquisition of extensive iron ore and coal deposits.

The result: In 1951 Kaiser Steel will attain a capacity of 1,380,000 ingot tons of steel. More than *double* the amount produced in 1944—the peak war year!

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Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars • carbon bars • structural shapes • cold rolled strip • cold rolled sheet special bar sections • semi-finished steels • pig iron • coke oven by-products. For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

The Market Outlook

CONFUSION attending allocation of steel under the Controlled Materials Plan will not be quickly erased. Time is too short to do much, if anything, about September over-allotments, especially on an individual company basis. So it looks like the mills and their customers holding unhonored CMP tickets will simply have to worry their way out of the current distribution tangle. Whether any radical corrective measures will be taken for fourth quarter is uncertain. Government control authorities think the "bugs" in CMP will work themselves out as time passes. Further, they now feel the situation is not as much out-of-hand as had been feared a week or so ago.

ALLOTMENTS—At any rate, with sentiment mixed as regards the efficacy of CMP in solving the distribution problem, there is little chance the system will be abandoned or radically changed. Fourth quarter allotments, just announced, will be much the same as for the current three months. Balance between supply and demand will not be achieved, but the margin of error will be smaller than in the current quarter. Total allotments of 24,058,520 net tons of finished steel will exceed indicated supply of 21,336,000 tons by 1,551,505 tons after allowing for an adjustment reserve of 1,171,015 tons. However, experience shows claimant agencies' actual take in a specified period usually falls below stated requirements. This is especially true of the military. The resulting anticipated unspecified tonnage along with the new adjustment reserve, it is thought, should provide an adequate insurance margin against serious unbalance. Further, indicated supply for fourth quarter is some 500,000 net tons greater than in third quarter. Consequently, over-allotments are believed unikely to exceed 10 per cent compared with 15 per cent in the current quarter.

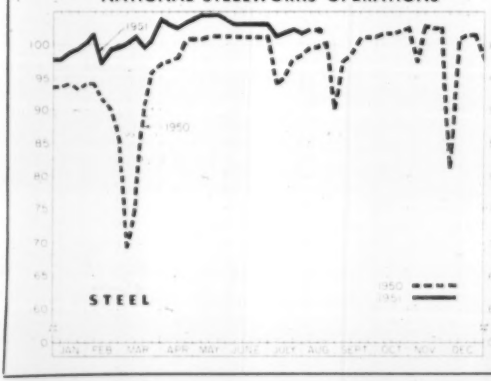
REQUIREMENTS—Another week, possibly longer, will be required by Washington to process fourth quarter tonnage applications of B products producers and those of still other manufacturers who are expected to be brought under CMP very shortly as the plan's open-end is closed. Makers of civilian consumer goods, now dependent on so-called "free" tonnage after essential needs are cared for, thus will be certain of receiving at least a portion of their requirements. Deadline for tonnage applications of such manufacturers was July 31. Clearly, some adjustment in allocation of rated tonnage may be necessary if the added burden of these consumers is to be worked into rated tonnage schedules since steelmakers long since have been fully covered on rated work for fourth quarter.

PRODUCTION—Record high output of steel entered its sixth month last week. In spite of hot weather, vacations, and other seasonal influences that normally affect summer production, as well as sporadic labor trouble, more than 2 million tons of steel have poured from the nation's furnaces weekly for 22 consecutive weeks. Never before has steel flooded into consumption in such volume. But, by the same token, demand never was so great as at present. How long this record output pace can be maintained is problematical with a serious shortage of scrap threatened in the months ahead.

OPERATIONS—Estimated national ingot rate last week went up ½ point to 102 per cent of capacity. District rates rose 5 points to 106 in Cincinnati, 3 points to 97.5 in Wheeling, 4 points to 98 in Pittsburgh and 1.5 points to 102.5 in Cleveland.

PRICES—Upward revisions in stainless and tool steel price lists are being made on the basis of authority recently granted by the Office of Price Stabilization. Other steel and related product prices are firm and unchanged at levels frozen early this year by OPS. STEEL's weighted index on finished steel is 171.92, while the arithmetical price composite holds at $106.32. Pig iron composites are steady with No. 2 foundry, $52.54, basic, $52.16, and malleable, $52.27. Steel scrap is firm at $44.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Aug 4	Change	Same Week 1950	Same Week 1949
Pittsburgh	98	+ 4*	100	76.5
Chicago	104.5	0*	101	89
Mid-Atlantic	101	0	98	78
Youngstown	105	0	108	80
Wheeling	97.5	+ 3	100	92
Cleveland	102.5	+ 1.5*	100	96.5
Buffalo	104	0	104	96
Birmingham	100	0	100	100
New England	92	— 2	98	55
Cincinnati	106	+ 5	106	91
St. Louis	95	—2	86.5	75.5
Detroit	102	+ 0.5	103	106
Western	101.5	— 3.5	103	89
Estimated national rate	102	+ 0.5	99.5	81.5

Based on weekly steelmaking capacity of 1,969,634 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 35 Production-Engineering News—p. 71

Composite Market Averages

	Aug. 2 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av. = 100)	171.92	171.92	171.92	156.69	112.04
Index in cents per lb.	4.657	4.657	4.657	4.245	3.035
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$94.36	$64.45
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	46.85	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	47.49	28.79
Steelmaking Scrap, GT	44.00	44.00	44.00	37.33	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown, Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Aug. 2 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.20	4.20	4.20	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10-15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.91	3.91	3.91	3.66	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.60	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.25-50	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.50	3.15
Strip, C.R., Detroit	4.35-5.60	4.35-5.60	4.35-5.60	4.35-95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.50	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, ½-⅝", Pitts., ¢	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.50	$29.00
Basic Valley	52.00	52.00	52.00	46.00	28.00
Basic, del. Phila.	56.49	56.49	56.49	49.44	29.93
No. 2 Fdry. Pitts.	52.50	53.50	52.50	46.50	28.50
No. 2 Fdry. Chicago	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry. Valley	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry. Del. Phila.	56.99	56.99	56.99	49.94	30.43
No. 2 Fdry. Birm.	48.88	48.88	48.88	42.38	24.88
No. 2 Fdry. (Birm. del. Cin.	55.33	55.33	55.33	49.08	28.94
Malleable Valley	52.50	52.50	52.50	46.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Elna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt., Pitts.	$45.00	$45.00	$45.00	$41.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	43.50	33.00	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	38.00	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	45.00	42.25	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	40.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	36.75	19.25
No. 2 Bundles, Chicago	52.50	52.50	52.50	50.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	44.50	20.00

* F. o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry. Connlsvl.	17.50	17.50	17.50	15.50	9.50
Oven, Fdrys., Chicago	21.00	21.00	21.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	22.50	14.375
Zinc, E. St. Louis	17.50	17.50	17.50	15.00	9.50
Lead, St. Louis	16.80	16.80	16.80	11.80	9.35
Tin, New York	103.00	106.00	106.00	98.00	52.00
Aluminum, del.	19.00	19.00	19.00	17.50	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.		58.69	59.46	
Newark, del.	56.74	57.24	57.74	58.24
Philadelphia, del.	56.49	56.99	57.49	57.99
Birmingham District				
Alabama City, Ala. R2	48.38	48.88		
Birmingham R2	48.38	48.88		
Birmingham S9	48.38	48.88		
Woodward, Ala. W15	48.38	48.88		
Cincinnati, del.		55.33		
Buffalo District				
Buffalo R2	52.00	52.50	53.00	
Buffalo H1	52.00	52.50	53.00	
Tonawanda, N.Y. W12	52.00	52.50	53.00	
No. Tonawanda, N.Y. T9		52.50	53.00	
Boston, del.	61.63	62.13	62.63	
Rochester, N.Y., del.	54.74	55.24	55.74	
Syracuse, N.Y., del.	55.72	56.22	56.72	
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00		52.50	
Indiana Harbor, Ind. I-2	52.00		52.50	
So. Chicago, Ill. W14	52.00	52.50	52.50	
So. Chicago, Ill. Y1	52.00	52.50	52.50	
So. Chicago, Ill. U5	52.00		52.50	53.00
Milwaukee, del.	53.97	54.47	54.47	54.97
Muskegon, Mich., del.		58.20	58.20	
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50*	
Akron, del. from Cleve.	54.49	54.99	54.99	55.49
Lorain, O. N3	52.00			53.00
Duluth, I-3			52.50	
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1		55.25	55.75	
Fontana, Calif. K1	58.00	58.50		
Geneva, Utah G1	52.00	52.50		
Seattle, Tacoma, Wash. del.		60.35		
Portland, Oreg., del.		60.35		
Los Angeles, San Francisco, del.	59.85	60.35		
Granite City, Ill. G4	53.90	54.40	54.90	
St. Louis, del. (Inc. tax)	54.66	55.16	55.66	
Ironton, Utah C11	52.00	52.50		
Lone Star, Tex. L6	48.00	*48.50	48.50	
Minnequa, Colo. C10	54.00	55.00	55.00	
Pittsburgh District				
Neville Island, Pa. P6		52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.		53.74	53.74	54.24
McKees Rocks, del.		53.49	53.49	53.99
Lawrenceville, Homestead, McKeesport, Monaca, del.		54.00	54.00	54.50
Verona, del.		54.48	54.48	54.98
Brackenridge, del.		54.72	54.72	55.22
Bessemer, Pa. U5	52.00		52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00			
McKeesport, Pa. N3	52.00			53.00
Monessen, Pa. P7	54.00			
Sharpsville, Pa. S6			52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.21	57.71		
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	
Youngstown Y1	52.00	52.50	52.50	
Youngstown U5	52.00			53.00
Mansfield, O. del.	56.43	56.93	56.93	57.43

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra, 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon, add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%, $1 for each 0.05% max. P.)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia, delivered	63.12
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Aug. 2, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ... $79.00
Munhall,Pa. U5 ... 52.00

INGOTS, Alloy (NT)
Detroit R7 ... $54.00
Fontana,Calif. K1 ... 80.00
Houston,Tex. S5 ... 62.00
Midland,Pa. C18 ... 54.00
Munhall,Pa. U5 ... 54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ... $56.00
Clairton,Pa. U5 ... 56.00
Ensley,Ala. T2 ... 56.00
Fairfield,Ala. T2 ... 56.00
Fontana,Calif. K1 ... 75.00
Gary, Ind. U5 ... 56.00
Johnstown,Pa. B2 ... 56.00
Lackawanna,N.Y. B2 ... 56.00
Munhall,Pa. U5 ... 56.00
So.Chicago,Ill. U5 ... 56.00
So.Duquesne,Pa. U5 ... 56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ... $66.00
Buffalo R2 ... 66.00
Canton,O. R2 ... 66.00
Clairton,Pa. U5 ... 66.00
Cleveland R2 ... 66.00
Conshohocken,Pa. A3 ... 73.00
Detroit R7 ... 69.00
Ensley,Ala. T2 ... 66.00
Fairfield, Ala. T2 ... 66.00
Fontana,Calif. K1 ... 85.00
Gary,Ind. U5 ... 66.00
Geneva,Utah G1 ... 66.00
Houston,Tex. S5 ... 74.00
Johnstown,Pa. B2 ... 66.00
Lackawanna,N.Y. B2 ... 66.00
LosAngeles B3 ... 85.00
Munhall,Pa. U5 ... 66.00
Seattle B3 ... 85.00
So.Chicago R2,U5,W14 ... 66.00
So.Duquesne,Pa. U5 ... 66.00
So.SanFrancisco B3 ... 85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $76.00
Buffalo R2 ... 76.00
Canton,O. R2 ... 76.00
Canton,O. (2%) T7 ... 66.00
Conshohocken,Pa. A3 ... 77.00
Detroit R7 ... 73.00
Fontana,Calif. K1 ... 89.00
Gary,Ind. U5 ... 76.00
Houston,Tex. S5 ... 78.00
Ind.Harbor,Ind. Y1 ... 76.00
Johnstown,Pa. B2 ... 76.00
Lackawanna,N.Y. B2 ... 76.00
LosAngeles B3 ... 90.00
Massillon,O. R2 ... 76.00
Midland,Pa. C18 ... 76.00
Munhall,Pa. U5 ... 76.00
So.Chicago R2,U5,W14 ... 76.00
So.Duquesne,Pa. U5 ... 76.00
Struthers,O. Y1 ... 76.00
Warren,O. C17 ... 76.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ... $82.00
Cleveland R2 ... 82.00
Fontana,Calif. K1 ... 103.00
Gary,Ind. U5 ... 82.00
Massillon,O. R2 ... 82.00
So.Chicago,Ill. R2 ... 82.00
So.Duquesne,Pa. U5 ... 82.00

SHEET BARS (NT)
Fontana,Calif. K1 ... $89.00

SKELP
Aliquippa,Pa. J5 ... $3.45
Munhall,Pa. U5 ... 3.35
Warren,O. R2 ... 3.35
Youngstown, R2, U5 ... 3.35

WIRE RODS
AlabamaCity,Ala. R2 ... 4.10
Buffalo W12 ... 4.10
Cleveland A7 ... 4.10
Donora,Pa. A7 ... 4.10
Fairfield,Ala. T2 ... 4.10
Fontana,Calif. K1 ... 4.90
Houston,Tex. S5 ... 4.50
Johnstown,Pa. B2 ... 4.10
Joliet,Ill. A7 ... 4.10
LosAngeles B3 ... 4.90
Minnequa,Colo. C10 ... 4.35
Monessen,Pa. P7 ... 4.30
No.Tonawanda,N.Y.B11 ... 4.10
Pittsburg,Calif. C11 ... 4.75
Portsmouth,O. P12 ... 4.30
Roebling,N.J. R5 ... 4.20
So.Chicago,Ill. R2 ... 4.10
SparrowsPoint,Md. B2 ... 4.20
Sterling,Ill.(1)—N15 ... 4.10
Struthers,O. Y1 ... 4.10
Torrance,Calif. C11 ... 4.90
Worcester,Mass. A7 ... 4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.45
Lackawanna,N.Y. B2 ... 4.45
Munhall,Pa. U5 ... 4.45
So.Chicago,Ill. U5 ... 4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ... 3.60
Aliquippa,Pa. J5 ... 3.65
Bessemer,Ala. T2 ... 3.65
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fairfield,Ala. T2 ... 3.65
Fontana,Calif. K1 ... 4.25
Gary,Ind. U5 ... 3.65
Geneva,Utah G1 ... 3.65
Houston,Tex. S5 ... 4.05
Ind.Harbor,Ind. I-2 ... 3.65
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.25
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.25
Minnequa,Colo. C10 ... 4.10
Munhall,Pa. U5 ... 3.65
Niles,Calif.(22) P1 ... 4.85
Phoenixville,Pa. P4 ... 4.95
Portland,Oreg. O4 ... 4.50
Seattle B3 ... 4.30
So.Chicago,Ill. U5, W14 ... 3.65
So.SanFrancisco B3 ... 4.20
Torrance,Calif. C11 ... 4.25
Weirton,W.Va. W6 ... 3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ... 4.35
Fontana,Calif. K1 ... 5.55
Munhall,Pa. U5 ... 4.35
So.Chicago,Ill. U5 ... 4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ... 5.50
Bessemer,Ala. T2 ... 5.50
Bethlehem,Pa.(14) B2 ... 5.50
Clairton,Pa. U5 ... 5.50
Fairfield,Ala. T2 ... 5.50
Fontana,Calif. K1 ... 6.10
Gary,Ind. U5 ... 5.50
Geneva,Utah G1 ... 5.50
Ind.Harbor,Ind. I-2 ... 5.50
Ind.Harbor,Ind. Y1 ... 6.00
Johnstown,Pa. B2 ... 5.50
Lackawanna,N.Y.(14) B2 ... 5.50
LosAngeles B3 ... 6.05
Munhall,Pa. U5 ... 5.50
Seattle B3 ... 6.10
So.Chicago,Ill. U5 ... 5.50
So.SanFrancisco B3 ... 6.00
Struthers,O. Y1 ... 6.00

Wide Flange
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fontana,Calif. K1 ... 4.65
Lackawanna,N.Y. B2 ... 3.70
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill. U5 ... 3.65

H.S. L.A. Wide Flange
Bethlehem,Pa. B2 ... 5.50
Lackawanna,N.Y. B2 ... 5.50
Munhall,Pa. U5 ... 5.45
So.Chicago,Ill. U5 ... 5.45

BEARING PILES
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill. U5 ... 3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.65
Bessemer,Ala. T2 ... 5.65
Clairton,Pa. U5 ... 5.65
Cleveland J5, R2 ... 5.65
Conshohocken,Pa. A3 ... 5.90
Fairfield,Ala. T2 ... 5.65
Fontana,Calif.(30) K1 ... 6.25
Gary,Ind. U5 ... 5.65
Geneva,Utah G1 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.65
Ind.Harbor,Ind. Y1 ... 6.15
Johnstown,Pa. B2 ... 5.65
Munhall,Pa. U5 ... 5.65
Pittsburgh J5 ... 5.65
Seattle B3 ... 6.55
Sharon,Pa. S3 ... 5.70
So.Chicago,Ill. U5 ... 5.65
SparrowsPoint,Md. B2 ... 5.65
Warren,O. R2 ... 5.65
Youngstown, Y1 ... 6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ... 4.85
Coatesville,Pa. L7 ... 5.25
Conshohocken,Pa. A3 ... 5.95
Fontana,Calif. K1 ... 5.70
Gary,Ind. U5 ... 4.75
Johnstown,Pa. B2 ... 4.75
Munhall,Pa. U5 ... 4.75
Sharon,Pa. S3 ... 5.20
So.Chicago,Ill. U5 ... 4.75
SparrowsPoint,Md. B2 ... 4.75

FLOOR PLATES
Cleveland J5 ... 4.75
Conshohocken,Pa. A3 ... 4.75
Harrisburg,Pa. C5 ... 5.95
Ind.Harbor,Ind. I-2 ... 4.75
Munhall,Pa. U5 ... 4.75
So.Chicago,Ill. U5 ... 4.75

PLATES, Ingot Iron
Ashland,e.l.(15) A10 ... 3.95
Ashland,lcl(15) A10 ... 4.45
Cleveland,e.l. R2 ... 4.30
Warren,O.,e.l. R2 ... 4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Ashland,Ky.(5) A10 ... 3.70
Bessemer,Ala. T2 ... 3.70
Clairton,Pa. U5 ... 3.70
Claymont,Del. C22 ... 4.15
Cleveland J5, R2 ... 3.70
Coatesville,Pa. L7 ... 4.15
Conshohocken,Pa. A3 ... 4.15
Donora,Pa. A7 ... 3.70
Fontana,Calif.(30) K1 ... 4.30
Gary,Ind. U5 ... 3.70
GraniteCity,Ill G4 ... 4.40
Geneva,Utah G1 ... 3.70
Harrisburg,Pa. C5 ... 4.95
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Minnequa,Colo. C10 ... 4.50
Munhall,Pa. U5 ... 3.70
Pittsburgh J5 ... 3.70
Seattle B3 ... 4.60
Sharon,Pa. S3 ... 3.95
So.Chicago,Ill. U5, W14 ... 3.70
SparrowsPoint,Md. B2 ... 3.70
Steubenville,O. W10 ... 3.70
Warren,O. R2 ... 3.70
Weirton,W.Va. W6 ... 4.00
Youngstown R2, U5, Y1 ... 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ... 5.45
Geneva,Utah G1 ... 4.85

PLATES, Wrought Iron
Economy,Pa. B14 ... 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Alton,Ill.(6) L1 ... 3.95
Atlanta,Ga. A11 ... 4.25
Bessemer,Ala. T2 ... 3.70
Buffalo R2 ... 3.70
Canton,O. R2 ... 3.70
Clairton,Pa. U5 ... 3.70
Cleveland R2 ... 3.70
Detroit R7 ... 3.85
Emeryville, Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.20
Minnequa,Colo. C10 ... 4.15
Niles,Calif. P1 ... 5.05
N.Tonawanda,N.Y. B11 ... 3.70
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.65
Seattle B3, N14 ... 4.45
So.Chicago R2,U5,W14 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFran.,Cal. B3 ... 4.45
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Weirton,W.Va. W6 ... 3.85
Youngstown R2, U5 ... 3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ... 3.70
Atlanta A11 ... 4.25
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Niles,Calif. P1 ... 5.05
Portland,Oreg. O4 ... 4.65
SanFrancisco B7 ... 4.85

BAR SIZE ANGLES;H.R. CARBON
Bethlehem,Pa. B2 ... 3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ... 4.30
Buffalo R2 ... 4.30
Canton,O. R2 ... 4.30
Canton,O.(2%) T7 ... 3.95
Clairton,Pa. U5 ... 4.20
Detroit R7 ... 4.45
Ecorse,Mich. G5 ... 4.65
Fontana,Calif. K1 ... 5.35
Gary,Ind. U5 ... 4.30
Houston,Tex. S5 ... 4.70
Ind.Harbor,Ind. I-2, Y1 ... 4.30
Johnstown,Pa. B2 ... 4.30
Kansas City,Mo. S5 ... 4.90
Lackawanna,N.Y. B2 ... 4.30
LosAngeles B3 ... 5.35
Massillon,O. R2 ... 4.30
Midland,Pa. C18 ... 4.30
So.Chicago R2,U5,W14 ... 4.30
So.Duquesne,Pa. U5 ... 4.30
Struthers,O. Y1 ... 4.30
Warren,O. C17 ... 4.30
Youngstown U5 ... 4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ... 4.55
Gary, Ind. U5 ... 4.55
Youngstown U5 ... 4.55

BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.55
Bessemer,Ala. T2 ... 5.55
Bethlehem,Pa. B2 ... 5.55
Clairton,Pa. U5 ... 5.55
Cleveland R2 ... 5.55
Fairfield,Ala. T2 ... 5.55
Fontana,Calif. K1 ... 6.60
Gary,Ind. U5 ... 5.55
Ind.Harbor,Ind. I-2 ... 5.55
IndianaHarbor,Ind. Y1 ... 6.05
Johnstown,Pa. B2 ... 5.55
Lackawanna,N.Y. B2 ... 5.55
LosAngeles B3 ... 6.25
Pittsburgh J5 ... 5.55
Seattle B3 ... 6.30
So.Duquesne,Pa. U5 ... 5.55
SoSanFrancisco B3 ... 6.30
Struthers,O. Y1 ... 6.05
Youngstown U5 ... 5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ... 4.55
BeaverFalls,Pa. M12,R2 ... 4.55
Buffalo B5 ... 4.60
Camden,N.J. P13 ... 5.00
Carnegie,Pa. C12 ... 4.55
Chicago W18 ... 4.55
Cleveland A7, C20 ... 4.55
Detroit P17 ... 4.70
Donora,Pa. A7 ... 4.55
Elyria,O. W8 ... 4.55
FranklinPark,Ill. N5 ... 4.55
Gary,Ind. R2 ... 4.55
GreenBay,Wis F7 ... 4.55
Hammond,Ind. L2, M13 ... 4.55
Hartford,Conn. R2 ... 5.10
Harvey,Ill. N5 ... 4.55
LosAngeles R2 ... 6.00
Mansfield,Mass. B5 ... 5.10
Massillon,O. R2, R8 ... 4.55
Monaca,Pa. S17 ... 4.55
Newark,N.J. W18 ... 5.00
Plymouth,Mich. P5 ... 4.80
Pittsburgh J5 ... 4.55
Putnam,Conn. W18 ... 5.10
Readville,Mass. C14 ... 5.10
St.Louis,Mo. M5 ... 4.95
So.Chicago,Ill. W14 ... 4.55
SpringCity,Pa.(5) K3 ... 5.00
Struthers,O. Y1 ... 4.55
Waukegan,Ill. A7 ... 4.55
Youngstown F3, Y1 ... 4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ... 5.40
BeaverFalls,Pa. M12 ... 5.40
Bethlehem,Pa. B2 ... 5.40
Buffalo B5 ... 5.40
Camden,N.J. P13 ... 5.80
Canton,O. R2 ... 5.40
Canton,O.(2%) T7 ... 4.90
Carnegie,Pa. C12 ... 5.40
Chicago W18 ... 5.40
Cleveland A7 ... 5.45
Cleveland C20 ... 5.40
Detroit P17 ... 5.55
Donora,Pa. A7 ... 5.45
Elyria,O. W8 ... 5.40
Gary,Ind. R2 ... 5.40
Hammond,Ind. L2, M13 ... 5.40
Hartford,Conn. R2 ... 5.85
Harvey,Ill B5 ... 5.40
Lackawanna,N.Y. B2 ... 5.40
Mansfield,Mass. B5 ... 5.85
Massillon,O. R2,R8 ... 5.40
Midland,Pa. C18 ... 5.40
Monaca,Pa. S17 ... 5.40
Newark,N.J. W18 ... 5.75
Plymouth,Mich. P5 ... 5.60
So.Chicago,Ill. R2, W14 ... 5.40
Struthers,O. Y1 ... 5.40
Warren,O. C17 ... 5.40
Waukegan,Ill. A7 ... 5.45
Worcester,Mass. A7 ... 5.75
Youngstown F3, Y1 ... 5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ... 4.75
ChicagoHts.(3,4) I-2 ... 4.50
Franklin,Pa.(3,4) F3 ... 4.75
FortWorth,Tex.(26) T6 ... 4.85
Huntingtn,W.Va.(3) W7 ... 5.50
Marion,O.(3) P11 ... 4.75
Moline,Ill.(3) R2 ... 3.80
Tonawanda (3,4) B12 ... 4.75
Williamsport(3) S12 ... 5.00
Williamsport(4) S12 ... 5.10

BARS, Wrought Iron
Dover,N.J.-Staybolt(U) ... 15.00
Dover,(Eng.Bolt) U1 ... 13.50
Dover(Wrgt.Iron) U1 ... 12.25
Economy,Pa.(S.R.) B14 ... 9.60
Economy,Pa.(D.R.)B14 ... 11.90
Economy,(Staybolt)B14 ... 12.20
McK.Rks.(Staybolt) L5 ... 14.50
McK.Rks.(S.R.) L5 ... 9.60
McK.Rks.(D.R.) L5 ... 13.00

BARS ,Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ... 3.70
Alton,Ill.(6) L1 ... 3.70
Atlanta A11 ... 4.25
Buffalo R2 ... 3.70
Cleveland R2 ... 3.70
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.20
Milton,Pa. B6 ... 4.20
Minnequa,Colo. C10 ... 4.50
Monessen,Pa. P7 ... 4.30
Niles,Calif. P1 ... 5.05
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.65
SandSprings,Okla. S5 ... 4.60
Seattle B3, N14 ... 4.45
So.Chicago,Ill. R2 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFrancisco B3 ... 4.45
SparrowsPoint,Md. B2 ... 3.70
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Youngstown, R2, U5 ... 3.70

BARS, Reinforcing
(Fabricated—Consumers)
Huntington,W.Va. W7 ... 5.50
Johnstown, ½-1" B2 ... 4.75
LosAngeles B3 ... 5.45
Marion,O. P11 ... 5.00
Seattle B3, N14 ... 5.55
So.SanFrancisco B3 ... 5.45
Sparrows Pt., ½-1" B2 ... 4.75
Williamsport,Pa. S19 ... 5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ... 3.60
Ashland,Ky.(8) A10 ... 3.60
Butler,Pa. A10 ... 3.60
Cleveland J5, R2 ... 3.60
Conshohocken,Pa. A3 ... 4.00
Detroit M1 ... 4.40
Ecorse,Mich.(8) G5 ... 3.80
Fairfield,Ala. T2 ... 3.60
Fontana,Calif. K1 ... 4.55
Gary,Ind. U5 ... 3.60
Geneva,Utah G1 ... 3.70
GraniteCity,Ill. G4 ... 4.30
Ind.Harbor,Ind. I-2, Y1 ... 3.60
Irvin,Pa. U5 ... 3.60
Lackawanna,N.Y. B2 ... 3.60
Munhall,Pa. U5 ... 3.60
Niles,O. N12 ... 5.25
Pittsburg,Calif. C11 ... 4.30
Pittsburgh J5 ... 3.60
Sharon,Pa. S3 ... 4.00
So.Chicago,Ill. W14 ... 3.60
SparrowsPoint,Md. B2 ... 3.60
Steubenville,O. W10 ... 3.60
Torrance,Calif. C11 ... 4.30
Warren,O. R2 ... 3.60
Weirton,W.Va. W6 ... 3.60
WestLeechburg,Pa. A4 ... 3.75
Youngstown U5, Y1 ... 3.60

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ... 4.75
Dover,O. R1 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.40
Mansfield,O. E6 ... 5.65
Niles,O. N12 ... 5.75
Torrance,Calif. C11 ... 5.40

SHEETS, H.R. (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ... 5.40
Conshohocken,Pa. A3 ... 5.65
Ecorse,Mich.G5 ... 5.95
Fairfield,Ala. T2 ... 5.40
Fontana,Calif. K1 ... 6.35
Gary,Ind. U5 ... 5.40
Ind.Harbor,Ind. I-2 ... 5.40
IndianaHarbor,Ind. Y1 ... 5.90
Irvin,Pa. U5 ... 5.40
Lackawanna,(35) B2 ... 5.40
Pittsburgh J5 ... 5.40
Sharon,Pa. S3 ... 5.40
So.Chicago,Ill. U5 ... 5.40
SparrowsPoint(36) B2 ... 5.40
Warren,O. R2 ... 5.40
Weirton,W.Va. W6 ... 5.75
Youngstown U5 ... 5.40
Youngstown Y1 ... 5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ... 6.55
Ecorse,Mich. G5 ... 7.10
Fontana,Calif. K1 ... 7.50
Gary,Ind. U5 ... 6.55
IndianaHarbor,Ind. Y1 ... 7.05
IndianaHarbor,Ind. I-2 ... 6.55
Irvin,Pa. U5 ... 6.55
Lackawanna(37) B2 ... 6.55
Pittsburgh J5 ... 6.55
SparrowsPoint(38) B2 ... 6.55
Warren,O. R2 ... 6.55
Weirton,W.Va. W6 ... 6.90
Youngstown Y1 ... 7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky. (8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland A10	5.60	
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary, U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo C16	6.25	
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	
SparrowsPt. B2	5.60	
Torrance,Cal. C11	6.35	

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.80
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths 1/2c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren R2	8.45	8.70
Weirton W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa J5	6.25
Fairfield,Ala T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
ConsProhocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(1) L1	3.75
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.-or-Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.60	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE

	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. (1) L1	4.85
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. M8	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	6.35
Crawfordsville,Ind. M8	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R5	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I. (12) N8	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR For Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill.(1) L1	6.25
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.50
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. M8	132
Donora,Pa. A7	130
Duluth A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	133
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda B12	140
Williamsport,Pa. S19	150

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville M8	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	133
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawforsville,Ind. M8	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.05
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)	4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

NAILS & STAPLES, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa. (13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh 03, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	23.00	13.5W,4Cr,3V	160.25
Extra Carbon	27.00	18W,4Cr,2V,9Co	246.50
Spec. Carbon	29.50	19W,4Cr,2V,7Co	246.00
Oil Hardening	35.00	18.25W,4.25Cr,1V,4.25Co	213.00
Cr. Hot Work	40.00	20.25W,4.25Cr,1.6V,12.25Co	353.50
Hi-Carbon-Cr	63.50	1.5W,4Cr,1V,5.5Mo	80.75
18W,4Cr,1V	151.00	6.4W,4.5Cr,1.9V,5Mo	97.50
18W,4Cr,2V	165.00	6W,4Cr,3V,6Mo	118.50

Tool steel producers include: A4, As, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia, del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill sizes.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 12" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 40" & narrower.
(38) 14 gage & lighter; 43" & narrower.
(39) 48" and heavier.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield, S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

Waiting for you to set them in motion

. . . Ready to give you something *above* the ordinary in service on tool, alloy, or stainless steel. Look how they can help you:

There's the man on the order desk in your nearby Carpenter MILL-BRANCH WAREHOUSE. He's waiting to give you quick information on prices, sizes, and grades. There's the representative ready to help you with tooling and production problems. There's the crew of delivery men backed by time-saving equipment to get out emergency orders.

And there's more. For *every* man in your nearby Carpenter MILL-BRANCH WAREHOUSE, there are *hundreds more* in the Reading Mill waiting to work for you. That's the difference. For Carpenter's warehouses are MILL-BRANCH WAREHOUSES. Every time you call you have a direct line on Mill Laboratory and Metallurgical Help, Mill Quality and Uniformity—*comprehensive* Mill Service.

You'll find it's the *closest* thing to having a *specialty* steel Mill right in your own back yard!

Here's what *you* want in steel service. To discover how easy it is to get it, call Carpenter. Simply pick up your phone and call your nearest Carpenter MILL-BRANCH WAREHOUSE or Distributor. The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.

SPECIALTY TOOL • ALLOY • AND • STAINLESS STEELS

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+2.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on ½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	78.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip— Cold-Rolled Carbon Base Both Sides 10%	Strip— Cold-Rolled Carbon Base Both Sides 20%	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Sheets— Cu Base Both Sides
302	....	....	....	....	19.75	27.50	77.00
304	25.00	28.00–29.50	....	....	20.75–24.50	27.50	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	31.50–34.00	....	....	26.00	36.50	....
317	34.50	39.00	....	....	....	....	....
318	38.50	38.00	....	....	....	....	....
321	26.50	31.00	....	....	23.00	33.00	111.00
347	27.50	30.50–32.00	....	....	24.00	33.50	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.25	44.25	41.00	54.00	....	....	....
Inconel	41.00	53.50	....	....	....	....	165.00
Monel	34.75	45.75	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4, stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ⅝-in.	18.5
¾-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Heavy
½-in. & smaller	15	15
⅝-in. & ⅝-in.	12	6.5
¾-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	16.5	6.5
¾-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	23	17.5
¾-in. & 1⅛-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅝-in.	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
	Light	
⅛-in. & smaller	35	
½-in. to ⅝-in.	28.5	
¾-in. and larger	26	

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	45 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants Structural ½-in., larger 7.85c
⅛-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-$1.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
4.5¼	40	21.50
3	40	22.61
2½	24,30	23.15
2	24,30	25.36
	CARBON	
40	100,110	8.03
35	100,110	8.03
30	84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03
14	60,72	8.57
10,12	60	8.84

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Baltimore, Types 301 through 347 sheet, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00 on Type 301, 36.50 on 302, 38.50 on 304, 58.50 on 316, 52.00 on 347, 30.50 on 410, and 31.00 on 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all products, R2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25 on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25 higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303 & 309; 316 sheets 62.00c, strip 64.00c, W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xylol ..25.00-33.50
Per ton bulk, ovens
Sulphate of ammonia..$32-$45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ...17.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots	16.00
Swedish, c.l.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 tons	50.00
Copper:	
Electrolytic	43.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	83.00
Nickel-Silver, 10-ton lots	44.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten:	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
1000 lb and over	4.00
Less than 1000 lb	4.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.85
200 to 500 lb	3.10
less than 200 lb	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil.fur. .$14.50-15.00
Connellsvil.fdry. ..17.00-18.00
New River, foundry ..21.30
Wise county, foundry ..15.95
Wise county, furnace ..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens..$22.75
Everett, Mass., ovens New England, del. ..*24.80
Chicago ovens 23.00
Chicago, del. 24.40
Terre Haute, ovens ...22.50
Milwaukee, ovens 23.75
Indianapolis, ovens ...22.75
Chicago, del. 26.28
Cincinnati, del 25.73
Detroit, del. 26.71
Ironton, O., ovens ...22.50
Cincinnati, del. 25.12
Painesville, O., ovens..24.00
Cleveland, del. 25.75
Erie, Pa., ovens 23.50
Birmingham, ovens ...20.30
Birmingham, del. 21.69
Philadelphia, ovens ...22.70
Neville Island, Pa., ovens 23.00
Swedeland, Pa., ovens..22.60
St. Louis, ovens
St. Louis, del. 25.40
Portsmouth, O., oven..22.50
Cincinnati, del. 25.12
Detroit, ovens 24.00
Detroit, del. 25.00
Buffalo, del. 26.75
Flint, del. 26.49
Pontiac, del. 25.42
Saginaw, del. 26.81

* Or within $4.15 freight zone from works.

Quantity
PRODUCTION
of
GREY IRON CASTINGS
ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES
ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION
MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.06	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††§	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††§	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.82
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City (city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansaCity (w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90¤	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75¤	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05¤	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85¤	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80¤	8.90¤	6.80	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60¤	9.20¤	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded); and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Ba = quantities, 2000 to 9999 lb except as noted; Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ²—500 to 1499 lb; ⁴—400 to 1499 lb; ⁵—3500 lb and over; ³—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract 17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:

Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit $65.00

Domestic scheelite, mines 65.00

Manganese Ore

Indian manganese, 46-48%, nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.5c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines $1.00

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa., $99.60. Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, O., Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merrill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

Magnesite

Per net ton, Chewelah, Wash. Domestic dead-burned, ⅛" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Nario, Clay Center, Woodville, Gibsonburg, Bettsville, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

33-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.55c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each). $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTES For current quotations on manganese, titanium and "other" ferroalloys, see page 115, July 23 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 115, July 30.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

Aug. 2	$44.00
July 26	44.00
July 1951	44.00
Aug. 1950	40.00
Aug. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+ 10.00
29. Shafting	+ 10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively. (2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10. (3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and Box axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 2 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.

(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3.

(4) For preparing into Grade No. 25, $6.

(5) For preparing into Grade No. 19, $6.

(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) For preparing into Grade No. 17 or Grade No. 21, $11.

(8) For preparing into Grade No. 18 or Grade No. 20, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

(3) For preparing into Grade No. 16, $4.

(4) For preparing into Grade No. 17, $5.

(5) For preparing into Grade No. 18, $7.

(6) For preparing into Grade No. 21, $4.

(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commissions shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.

Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 60c.

Canton, O., 51c; Chicago (including Gary, Ind., $1.34); Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.

Coatesville, Pa., 50c; Conshohocken, Pa., 20c.

Detroit, 95c; Duluth, Minn., 50c.

Harrisburg, Pa., 51c; Houston, Tex., 57c.

Johnstown, Pa., 75c.

Kansas City, Mo., 78c; Kokomo, Ind., 51c.

Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.

Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.

St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.

Warren, Pa., 75c; Weirton, W. Va., 70c.

Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory, prep'd.	33.00
Bushelings new factory, unprep'd	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.

SCRAP

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The Metal Market

Fourth quarter demand for copper exceeds supply by 70 per cent; that for aluminum, 45 per cent. Shortages are expected to continue at least through 1952

ALLOCATIONS of copper and aluminum for delivery in the fourth quarter indicate that the shortages will remain acute during that period. An approximate balance between demand and supply is not expected to be attained until late 1952 at earliest. The average demand for copper and copper-base alloys in the fourth quarter is about 170 per cent of supply; that for aluminum, about 145 per cent.

NPA estimates copper supply for the final three months of the year at 583,000 tons against 557,000 tons in the third quarter; supplies of aluminum, 299,000 tons in each of the periods. Against this probable supply, NPA made total allotments of 662,970 tons of copper and 340,737 tons of aluminum. The apparent over-allotment takes into consideration the fact that requests for direct military use are consistently larger than amounts actually taken out of the market.

Large tonnages of copper have been booked at 24.50c by leading domestic producers against August allocations. Large tonnages of foreign copper also are being booked at 27.50c. The Garfield smelter of American Smelting & Refining Co. has resumed operations following a prolonged strike, but new difficulties have developed in negotiations between Kennecott Copper Corp. and its Garfield workers. Labor troubles continue to be a serious threat to future supplies.

In the case of aluminum, production is being expanded rapidly, although the government's plans for bringing a fourth producer of primary ingot into the industry have been delayed. Harvey Machine Co. has been unable to qualify under the original proposal for a $45 million government loan which would be used for construction of an aluminum plant at Kalispell, Mont., and an alumina plant in the state of Washington. An alternative proposal is now under consideration.

Cadmium Supplies Improve

Supplies of cadmium have shown marked improvement. As a result, you are permitted increased use of the metal in a wide range of military and civilian products. NPA amended order M-19 because inventories of cadmium have been backing up in the hands of producers, pending placement of a larger volume of defense orders.

Under the original cadmium order, use of the metal was permitted in pigments only for certain essential purposes. All other uses for pigmentation or coloring were limited to 40 per cent of the producers' average monthly use for such purpose during the first half of 1950. The amount of cadmium that may be used for these less essential purposes is increased to 60 per cent of the base period use.

Permitted use of cadmium in silver-brazing alloys is increased from 19 per cent to 25 per cent cadmium by weight. Cadmium now may also be used in bearings for automotive replacement parts, including carburetors and magnetos.

Accumulations of inventory exceeding 30-day needs is permitted when necessary because of minimum purchasable quantities.

RFC Cuts Tin Price to $1.03

Reconstruction Finance Corp. lowered its selling price of Grade A tin 3 cents a pound Aug. 1 to $1.03. This reflects the recent improvement in its supply position.

World mine production of tin increased to 15,600 long tons in May from 14,500 in April, a gain of 1100 tons, reports the International Tin Study Group, The Hague. There was an increase in output by all important producing countries with the May totals including: 4836 tons for Malaya, 3862 tons (exports) for Bolivia, 2713 tons for Indonesia, and 1442 tons for the Belgian Congo. Partial reports for June are available, including 4656 tons for Malaya, 1486 tons for Indonesia, and 1328 tons for Belgian Congo.

Dow Magnesium Sales Soar

Sharp rise in military demand for magnesium jumped Dow Chemical Co.'s sales of that metal to 30,000 tons during the fiscal year ended May 31. Sales in the previous fiscal year totaled 16,000 tons. During its last fiscal year, the company stepped up its Freeport, Tex., production of magnesium to capacity. The company also is reactivating production of magnesium in the government-owned plant at Velasco, Tex.

The Census Bureau reported that net shipments of magnesium wrought products unadjusted for the number of working days increased to 1,716,000 pounds during May from 1,531,000 pounds in April and 850,000 pounds in May 1950.

Revises Aluminum Foil Order

Coverage of aluminum foil order, M-67, was broadened by NPA to include all types except insulation foil. The order originally covered only aluminum foil used in containers and packaging materials. Amendment to the order brings in other uses, such as aluminum foil for household purposes, for florists, gift wrapping and seal and label usages. These had been controlled by order M-7 which was revoked July 1.

The amendment will help aluminum foil converters obtain controlled materials through one NPA industry division because the change puts all converted foil, except insulation foil, under jurisdiction of the NPA Containers and Packaging Division.

Other changes include: Establishment of quarterly rather than monthly quotas; a regrouping of items in schedule 1 of M-67; addition of a new group 5 which covers the use of programs previously under control of M-7; establishment of an inventory limitation of a minimum working inventory of not more than 60 days.

NPA Orders Lead Allocations

Allocation of supply of domestically produced soft pig lead became effective July 26. At the same time, limitations were established on the required acceptance of rated orders for pig lead products and alloys. Delivery of soft primary pig lead for any purpose may not be accepted except in accordance with an NPA allocation authorization. An application for an allocation must be filed on NPAF-115 not later than the 10th day of the month preceding the month in which delivery is required. Application authorizations and prohibition on delivery do not apply to: acceptance of lead by the General Services Administration; acceptance of pig lead from a foreign source; acceptance of pig lead by any person whose total receipts during the calendar month in which acceptance occurs are, and would remain, less than 10 net tons, and who has not applied to NPA for an allocation authorization for that month, and who furnishes to the supplier a certification to the effect that receipt of the shipment will be in compliance with M-76.

STEEL'S Metal Price Averages for July, 1951

(Cents per pound)

Electrolytic Copper, del. Conn.	24.500
Lead, St. Louis	16.800
Prime, Western Zinc, E. St. Louis	17.500
Straits Tin, New York	106.000
Primary Aluminum ingots, del.	19.000
Antimony, f.o.b. Laredo, Tex.	42.000
Nickel, f.o.b. refinery	56.500
Silver, New York	90.160

Aluminum Product Shipments

May shipments of aluminum wrought products, on an average working-day basis, were 9 per cent below April but 12 per cent over May, 1950, reports the Bureau of the Census. Net shipments, unadjusted for the number of working days, amounted to 145 million pounds in May compared with 152 million pounds in April and 129 million pounds in May, 1950.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley, Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.60c, pigs 18.60c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 66.50c. Prices include 4½c import duty.

Mercury: Open market, spot, large lots, New York, $205-$216 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; effective May 23, 1951)

Sheet: Copper 40.18; yellow brass 37.28; commercial bronze, 95% 40.18; 90% 39.78; red brass, 85% 38.86; 80% 38.47; best quality, 38.07; nickel silver, 18% 50.99; phosphor-bronze grade A, 5% 59.42.

Rod: Copper, hot-rolled 36.03; cold-drawn 37.28; yellow brass free cutting, 31.76; commercial bronze, 95% 39.87, 90% 39.47; red brass 85% 38.55; 80% 38.16.

Seamless Tubing: Copper 40.22; yellow brass 40.29; commercial bronze, 90% 42.44; red brass, 85% 41.77.

Wire: Yellow brass 37.57; commercial bronze, 95% 40.47; 90% 40.07; red brass, 85% 39.15; 80% 38.76; best quality brass, 38.36.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.18, l.c.l. 30.18. 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, Inches	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.035	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4,	——Hexagonal—— R317-T4	17S-T4
	17S-T4		
0.125	52.0	....	....
0.1563-0.188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. to diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c, 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums 1000 lb 60.8c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98% ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl. 33.00c; up to 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 79.20c; 100 or 350 lb drums only, 100 to 600 lb, 64.50c; 700 to 1900 lb, 62.00c; 2000 to 9900 lb, 60.20c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	19.75
Phos. bronze, A	27.00	26.75	25.75

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00c per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50; engravers' and lithographers' plates, 14.50c; die cast slabs, min. 90% zinc, 12.25; old zinc scrap, 11.25c; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Aug. 1-2	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July 2-31	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 28-30	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 18-27	24.50	16.80	17.50	106.00	19.00	42.00	56.50	87.75
June 15-16	24.50	16.80	17.50	111.00	19.00	42.00	56.50	87.75
June 14	24.50	16.80	17.50	118.00	19.00	42.00	56.50	87.75
June 13	24.50	16.80	17.50	123.00	19.00	42.00	56.60	87.75
June 8-12	24.50	16.80	17.50	129.00	19.00	42.00	56.50	87.75
July-Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	56.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	56.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

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How Ladle Inoculants Reduce Chill . . . Produce High-Strength, Machinable Iron

One of the most significant developments in the field of cast iron metallurgy during recent years has been the widespread growth of the process of "inoculation" in producing quality metal to strict specifications. Inoculation has been defined as "a process in which an addition is made to molten cast iron for the purpose of altering or modifying the micro-structure of the iron and thereby improving the mechanical and physical properties to a degree not explainable on the basis of the change in composition."*

Various ladle addition alloys are used for inoculation of cast iron, but there is a wide range in the efficiency and potency of these materials. The 50 per cent and 75 per cent ferrosilicons are mild inoculants, but they are used as ladle additions principally as a means of adjusting the silicon content of cast iron. The 85 per cent and 90 per cent grades of ferrosilicon are much more effective inoculants. Inoculating power is further improved through the use of special inoculating alloys, such as silicon-manganese-zirconium ("SMZ" alloy) and calcium-silicon.

ELECTROMET produces a number of alloys for inoculation, each of which has specific applications. The graphitizing inoculants are:

"SMZ" Alloy	60-65% silicon 5-7% manganese 5-7% zirconium
Calcium-Silicon	30-33% calcium 60-65% silicon
90% Ferrosilicon	92-95% silicon
85% Ferrosilicon	83-88% silicon
Special Graphitizer	A mixture of ferro-silicon and graphite for special uses.
75% Ferrosilicon	73-78% silicon
50% Ferrosilicon	47-51% silicon

These inoculants are usually added to the molten iron as it leaves the cupola spout, or during transfer from one ladle to another.

"SMZ" Alloy—An Efficient Inoculant

The benefits of inoculation are obtained largely as the result of rigid control of the structure of the graphite phase of cast iron which has received this treatment. The results of inoculation on the properties of a typical cast iron are demonstrated by the accompanying illustrations showing the effect of adding various amounts of "SMZ" alloy.

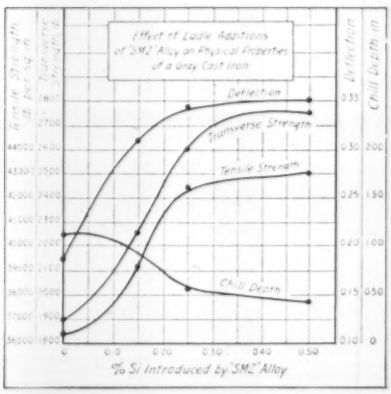
Effect of Ladle Additions of SMZ Alloy on Physical Properties of a Gray Cast Iron
Deflection
Transverse Strength
Tensile Strength
Chill Depth
Deflection
Chill Depth in
% Si Introduced by "SMZ" Alloy

Fig. 1—These curves show how additions of "SMZ" alloy reduce depth of chill and improve mechanical properties when added to a series of irons selected to give the following final analysis: 3.10 total carbon, 0.60 combined carbon, 1.80 silicon, and 0.50 manganese.

Effects of Inoculation

The effects of graphitizing inoculants are: a drastic decrease in the chilling tendency of a given iron, a mild decrease in Brinell hardness, lowering of the section sensitivity of the metal, a definite increase in tensile strength, and an increase in transverse strength and deflection. These benefits are usually accompanied by improved fluidity, better castability, and improved resistance to wear.

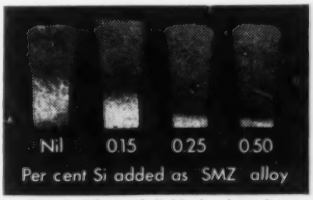

Fig. 2—These chill blocks show how progressive additions of "SMZ" alloy reduce the depth of chill.

New Stabilizing Inoculant

For the production of cast iron, ELECTROMET developed recently a special low-carbon foundry ferrochrome. This silicon-chromium alloy is so balanced in composition that it increases the strength and hardness of gray iron, without increasing chill. The new alloy has a nominal analysis of 30 per cent silicon and 50 per cent chromium. It has excellent solubility in iron, and the inoculating effect of the silicon content makes it possible to add up to 1 per cent chromium to gray iron as a ladle addition, with no appreciable increase in chill. Castings treated with the new alloy have an excellent balance between machinability and good resistance to wear.

Booklets Available

Further information about ladle inoculants is given in the booklets, "SMZ Alloy and Its Uses as a Ladle Addition to Cast Iron" and "Silicon-Chromium Alloy in Complicated Iron Castings." You may obtain copies, free of charge, by writing or phoning to the address given above or to the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

The terms "EM," "Electromet," and "SMZ" are registered trade-marks of Union Carbide and Carbon Corporation.

*Definition by H. W. Lownie, Jr.—A.F.S. Symposium on "Inoculation of Gray Cast Iron."

Sheets, Strip . . .

Sheet and Strip Prices, Page 155 & 156

Chicago—Many consumers are disturbed over inability to find accommodation for their CMP tonnage with usual supply sources during September and fourth quarter. Regulations which required mills to book CMP business on a first-come first-serve basis squeezed out a number of users whose certifications suffered processing delays in Washington. Cold-rolled sheet production in September will be curtailed somewhat because of NPA's directive for about 40,000 additional tons of tin plate.

Boston — Midsummer slackening among consumers is more pronounced than warranted by seasonal factors alone but has slight effect on orders at the mill level. Shoe demand, for instance, is dull and only government orders for 2.5 million pairs are keeping some shops going. Yet steel demand is maintained at high level.

Philadelphia—Unless there is further upward revision in the percentage of set-asides, or some other modifications in regulations, producers are sold out for the fourth quarter on certified hot and cold-rolled sheets, galvanized and silicon sheets.

Pittsburgh—Carryover for fourth quarter will include some validated orders. Liberal granting of certificates by Washington has created an extreme distribution problem here.

Cleveland—The mills are loaded with tonnage carrying CMP tickets to such extent many consumers are having difficulty placing their authorizations. Indications are there will be a substantial carryover of third quarter tonnage into the October-November-December period, which, of course, may push some scheduled deliveries for that period into the first quarter of next year.

Cincinnati—Mill schedules cannot contain all CMP orders and confusion is the result. Even at this early date a large carryover from third quarter is indicated.

Los Angeles—With the flood of CMP certifications heavier than expected, mill books are closed on flat-rolled products for fourth quarter.

Steel Bars . . .

Bar Prices, Page 155

Cleveland—Over-allocation of tonnage under the Controlled Materials Plan will result in substantial mill carryovers from month-to-month of validated orders until such time as CMP allotments more closely approximate production. Most bar mills are already booked solidly for fourth quarter on CMP orders and the leadtime deadline for the placing of orders is still two weeks away.

Boston—Cold-finished carbon and alloy bars for fourth quarter distribution present a major scheduling problem. Orders are on hand to take up capacity, but fitting this volume to mill space will be difficult. Some sizes are definitely sold up on revalidated DO orders.

New York—Hot carbon bar sellers generally are sold up for fourth quarter on rated tonnage. If set-asides were increased the picture would be changed somewhat, but only at the expense of "free" tonnage.

Philadelphia—Whereas a week ago most producers of hot carbon bars were booked up for the remainder of the year on only the smaller sizes and larger shell sizes under certification, most sellers are now booked up on all sizes.

Pittsburgh—Supply situation in all types of bars, hot, cold and alloy, is stringent. Fourth quarter order books are just about filled with certified tonnage and producers are swamped with other certified orders—asking third quarter delivery in some instances. Greatest demand is for 3-in. and larger in all types.

Seattle—Bar mill order backlogs extend to end of fourth quarter. Demand for reinforcing and merchant bars continues strong but sellers are selective in accepting new orders. Defense and related needs get first call on output.

Tin Plate . . .

Tin Plate Prices, Page 156

Chicago—Tin plate producers have been directed by NPA to produce extra tonnage during September. The agency is seeking to find accommodation for about 50,000 tons during this month and is understood to have spotted only between 38,000 and 40,000 tons.

Structural Shapes . . .

Structural Shape Prices, Page 155

Philadelphia — Structural awards are scattered, with little active inquiry other than bridge work. There is, however, considerable industrial work in tentative stages. Fabricating shops are being turned down on some rated tonnage for final three months of the year, the mills being overloaded.

Boston—Revalidation of CMP allotments from third to fourth quarter is complicated, in some cases delayed. Fourth quarter potential requirements are far in excess of scheduled mill capacity. Close to 23,000 tons of rejected bridge bids in New England will be readvertised.

New York—Fear of "getting caught in an escalator" is causing many builders to move slowly in bringing out new work. Much uncertainty exists as to the availability of steel and other materials.

Pittsburgh—Overvalidation of third quarter shape tonnage is evident. Many industrial construction projects may be delayed.

Chicago—NPA directives for September and fourth quarter are complicating production schedules which already are filled to capacity. The situation will become more complicated when NPA begins issuing directives for emergency replacement and repair of bridges and other heavy structures in the Missouri-Kansas flood area.

Seattle — Structural fabricators hold substantial order backlogs but new bookings are measured to the limited supplies of shapes. Some local business went to plants in Oklahoma and Texas. Recent awards include 1800 tons for the Chief Joseph dam and 1000 tons for Eielson airfield, Alaska, hangar. Washington state plans a highway bridge, the Pasco-Kennewick, involving 4500 tons, bids about Oct. 1. Considerable tonnage pends for Alaskan installations.

Stainless Steel . . .

Stainless Steel Prices, Page 159

New York—Stainless steel sheet distribution is under rigid control because of the need for conserving nickel. Hence, deliveries are not so extended as on the major carbon grades for which CMP tickets have apparently been issued with a free hand. Straight chrome grades are not in overly strong demand, especially from distributors who are cautious in laying in inventories due to uncertainties as to how these grades will be accepted in many cases as substitutes for nickel chrome steels.

Wire . . .

Wire Prices, Page 157

Boston — Wire mills are filled through third quarter but some volume for this period is being booked by revision of orders. Users are ordering to full extent of allotments, though in some cases orders for finished goods do not match steel tonnage placed.

New York—Shortage of rods continues to hamper wiremakers. Some drawers say rod supply this month will be tightest so far this year. They see no improvement for September. Betterment in the fourth quarter will depend upon how well the Controlled Materials Plan operates.

Cleveland—Special tonnage directives for steel required in the flooded areas of Missouri and Kansas are expected to come through shortly, probably for September shipment. Heavy share of this added tonnage burden is expected to be on the wiremakers.

Plates . . .

Plate Prices, Page 155

Cleveland—Plate suppliers are practically booked through fourth quarter and there is comparatively little tonnage available on other than CMP allocation. Supply situation, however, is slightly improved compared with a few months back in that producers are able to give their customers better deliveries with the demand load more widely distributed.

Boston—Fourth quarter plate capacity will be taken up by CMP allotments and directives against listed A products. Bethlehem Steel Co. has booked three additional super-tankers with capacity of better than 250,000 barrels each, making 12 ships on order with two building.

New York—Plate fabricators report difficulty in getting steel against even rated allotments. Only on work requiring special directives are they able to figure promptly and with any assurance.

Pittsburgh—September plate distribution, although entirely on a directive basis will be complicated. Most producers hold validated orders in excess of potential supply. Confusion will not clear away until fourth quarter. Demand for light plates runs high with heavy plates not far behind.

Chicago—Already booked to capacity and unable to accommodate considerable tonnage sought by CMP customers during September and

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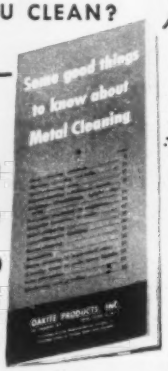

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fourth quarter, platemakers are harassed by numerous NPA directives.

Philadelphia—While some independent plate mills are not fully booked for fourth quarter, most larger mills are. This in part is due to the fact the latter are on a lower price level.

Seattle — Small fabricators' business is limited by the tonnage of plates available to them. Consequently they are booking new orders cautiously, especially larger jobs. Small contracts are fairly numerous.

Tool Steel . . .

Tool Steel Prices, Page 157

Fitchburg, Mass.—Flat ground die steel bars in 36-in. lengths in standard stock sizes from ½ to 2-in. up to 1½ to 10-in., have been added by Simonds Saw & Steel Co. to its product list. These sizes are in addition to the regular 18-in. length bars furnished in 159 stock sizes.

New York—Bethlehem Steel Co. has advanced base prices at its producing mill in Bethlehem, Pa., on all grades of high speed tool steels and specialty steels, containing tungsten. The increases amount to 1.5 cents for each 1 per cent of tungsten content for each pound of product, and were effective with quotations and shipments made on and after July 27.

Tubular Goods . . .

Tubular Goods Prices, Page 159

Seattle—Numerous jobs calling for cast iron pipe are being figured, many of them Alaskan installations. Generally, muncipal calls include alternatives it being difficult for cast pipe sellers to meet specified delivery dates. Seattle placed 1400 tons of 24 and 16-in. pipe for a local project.

Warehouse . . .

Warehouse Prices, Page 161

New York—Warehouse demand will be seasonally affected this month as it was in July by mass vacations in various metalworking plants. However, demand continues to exceed supply chiefly because of restricted inventories.

Philadelphia—Warehouses are receiving their established quotas from the mills, but not in the sizes and specifications always desired. As a result their inventories are further unbalanced.

Cleveland — Local warehouses report pressure off slightly seasonally, but they could do much larger volume business were their stocks adequate to meet all the demands coming to them. Receipts from the mills over fourth quarter are expected to be pretty much in line with the tonnage due them under government regulation, 85 per cent of receipts in the base period. However, with the amount of "free" steel shrinking overall supply heretofore available to the distributors will be down. Relatively little is heard of "gray" market steel these days. So far as can be ascertained volume in this market is extremely limited. Foreign steel is being delivered by vessel at Great Lakes ports. Last week around 500 tons of miscellaneous products from Belgium were delivered at Cleveland by a Norwegian freighter.

Chicago—Mills wonder how they can comply fully during August with NPA's directive to increase from 85 to 130 per cent of base period shipments of certain steel products to warehouse customers in the Kansas-Missouri and Oklahoma flood areas. The directive covers August and September.

Los Angeles—Distributors are distressed over General Price Regulation Supplementary Regulation 42 which permits mills to raise prices of high-speed tool and specialty steels containing tungsten but allows the distributors only to charge new ceiling prices on steel received after the mill price increases. Distributors say this will require segregation and duplication of price lists.

Seattle—Steel distributors are under strong pressure for tonnage. Supplies, however, continue short, especially sheets and plates.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 159

Cleveland—Production of wrought washers is limited to the extent of raw material supply. Demand continues strong and makers are maintaining output at satisfactory level. The market is firm at price levels frozen last January. Price lists vary from producer to producer, up to list plus $3 being quoted. However, list to list plus $1 is considered a more representative market quotation.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 159

Pittsburgh — Metallurgical coke supply now is less a problem for foundries and steel plants. Oven coke demand is much reduced over the past few weeks. Two district blast furnaces are off for repairs allowing some inventory-building. Connellsville beehive demand has fallen and the market is slow.

Rails, Cars . . .

Track Material Prices, Page 157

Cleveland—Bids will be asked shortly by the Cleveland Transit System for at least 70 rapid transit cars, estimated to cost $55,000 apiece, a signaling system to cost $1,350,000, electrical rectification equipment costing $1,300,000 and other equipment and supplies required for the proposed rapid transit line through the city. The Reconstruction Finance Corp. last week approved loan of $29,500,000 for the project, construction of which will start within three or four months provided steel and other materials are available without delay. Large steel tonnage will be required, including structurals, plates, wire, etc. The steel companies have been in receipt of requests for prices over past months but no formal inquiries for tonnage as yet have come out.

Chicago—Rail mills report some cancellations of rail and track accessory orders. These come solely from Missouri-Kansas flood areas where because of conditions railroads will not be able to proceed with planned replacement programs or new construction.

Iron Ore . . .

Iron Ore Prices, Page 161

Cleveland—Lake Superior iron ore shipments are moving at a rate that may establish an all-time high for the season. In the record 1942 year, 92,076,781 tons were shipped. Shipments totaled 3,151,732 tons in the week ended July 30 compared with 3,196,323 in the preceding week and 2,962,428 tons for the like week a year ago. The cumulative total to 7 a. m., July 30, is 44,972,676 tons, gain of 11,301,296 tons over the 33,671,380 tons shipped in the like period a year ago.

Pig Iron . . .

Pig Iron Prices, Page 154

Boston—Mystic Iron Works, operator of the only blast furnace in New England, and which supplies about 95 per cent of the merchant foundry iron in the area, proposes to customers a 5-year extension of present contracts due to expire July 1, 1952. The proposal is due chiefly to the tight iron ore situation, according to J. H. Treanor, vice president. The company feels it advisable to make long-term ore commitments and if a majority of its customers agree to contract extensions will proceed to see what ore arrangements it can make.

Recently Mystic's method of pricing in its long-term contracts was approved by OPS. These contracts were introduced in 1947 when competitive disadvantages made it clear the furnace could not continue to operate due to losses sustained in meeting competitive prices.

Realizing the strategic importance of the furnace to New England industry, approximately 200 district foundries signed contracts agreeing to purchase a definite portion of their pig iron requirements on the basis of cost plus a guaranteed maximum mark-up above cost in order to make it possible for the furnace to operate at a fair profit over a reasonably long-range period.

New York—Fewer foundries will close this month for vacations, but there will still be a number of suspensions and this should have some bearing on demand pressure for pig iron. Some plants are arranging to take in shipments but in general where they are down for vacations they are taking in little raw material of any description.

Buffalo—Plant closings for vacations have had only a minor effect on the urgent pressure for merchant pig iron deliveries. More government work is noted in the area.

Philadelphia—The smaller of the two stacks at Swedeland, Pa., was put back into blast a few days ago after suspension of approximately a month for repairs. This will not be reflected in the merchant trade to any great extent for a while, as basic iron inventories will have to be built up for the stack's affiliated mill at Conshohocken.

Pittsburgh—No relief is in sight in the critical pig iron supply situation. Near-capacity operation continues with 52 of the 54 district stacks in blast. Foundry and steel plant inventories are low. Increased iron ratio in melts to compensate for

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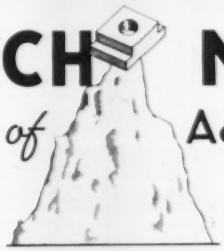

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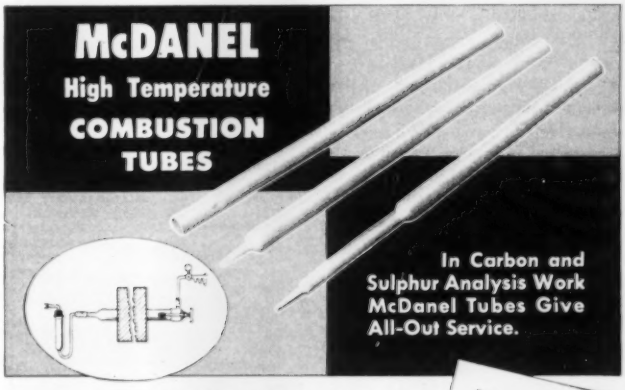

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scrap lack is reflected in high pig iron demand.

Cleveland—No summer lull in demand for pig iron has been experienced here although many foundries have been down for the usual vacation periods. However, most of the shops continued to take in iron steadily. Right now buyers are seeking to assure themselves adequate supplies over fourth quarter during which period the supply stringency is expected to be more acute than ever. One blast furnace in this district providing tonnage for the merchant market is scheduled to go down for repairs next month.

Chicago—Wisconsin Steel Division, International Harvester Co. blew out its No. 1 blast furnace at South Chicago Aug. 1 for enlarging and relining.

Los Angeles—To increase iron production, Colorado Fuel & Iron Corp. is rebuilding its "A" blast furnace at cost of $1.5 million. Completion is scheduled by 1952.

Seattle — Domestic pig iron tonnage is practically unobtainable in this district with producers using more of their output of iron in their own steelmaking operations. Foundries are conserving their limited inventories by increasing the scrap ratio in their melts. European pig is being offered in small lots. Prices applying are approximately $20 per ton above those on domestic material.

Scrap . . .

Scrap Prices, Page 162

Boston — Allocations on dealer yards are few. Shipments are heavier than yard take in some cases. Consumers of steel scrap are unable to build inventory. Most railroad and government scrap is allocated. On the basis of rail shipment, No. 1 heavy melting steel is $34.17, Boston, but some volume is rumored higher on unofficial barge rates, at Providence reportedly $37.25

New York — Stringency in steel grades may not be as pronounced this month as last. It is thought there will be a better flow of industrial material. Many metalworking plants will observe mass vacations, but not as many as last month and this should be reflected in available tonnage. Whatever easing may develop, it appears doubtful that consumers will be able to more than keep even on inventories. Most mills see nothing but a marked shortage ahead for many weeks. Cast scrap is in better supply than steel grades.

Buffalo—Mill reserve stocks are being built up at a more rapid pace. Dealers also report improvement in the volume of collections. Allocations from outside areas continue substantial. Approximately 8000 tons arrived from the eastern seaboard via the canal last week.

Philadelphia—Most district steel scrap consumers appear to have maintained inventories over the past week. Indications are that possibly the low point in scrap shipments has been passed.

Pittsburgh—Slight easing in scrap is marked by better receipts and faster movement of all grades. However, movement must improve considerably to allow stockpiling for winter. General opinion is that movement of all grades will increase in the fall because of normal higher productivity.

Cincinnati—Less industrial scrap is coming out, throwing a heavy burden on other sources to maintain the heavy mill melt. Allocations provide adequately to support such melt, but no seasonal buildup of stocks is possible.

Chicago—Hot weather is holding the steelmaking rate down by a point or two but since operations are well over capacity this is almost unnoticed insofar as scrap consumption is concerned. Mill-grade scrap flowing into this district still only matches consumption thus the inventory picture ranging from 6 to 12 days at individual mills remains unchanged. For fall and winter the outlook is bleak.

Seattle—Foundries in this area are engaged above normal. Cast scrap is not plentiful but tonnage is sufficient to support melting operations. Favorable weather is stimulating steel scrap receipts. Heavy consumption prevents accumulation of inventories. Substantial tonnage is coming into the market from mining operations and the Navy is planning to salvage an estimated 40,000 tons in the Aleutians. Scrap from Okinawa and Korea is reported going to Japanese mills. Local scrap consumers are pressing the Maritime Commission to scrap a number of vessels that cannot be reconditioned within reasonable cost limits.

Manganese Ore . . .

Washington—Government's 5-year domestic manganese development program makes no provision for stimulating production at 2000 or more known idle manganese deposits in the nation, according to J. Carson Adkerson, president, American Manganese Producers Association.

Purchase of ores through the program at Butte, Philipsburg, Mont., and Deming, N. Mex., will supply only about 2 per cent of the nation's annual consumption, he says.

Approximately 2 million tons of manganese are consumed yearly. The new program provides only for a maximum of around 38,000 tons per year of standard grade ore. Even this may not be obtained, Mr. Adkerson says, pointing out few domestic mines will be able to produce under the program since the prices and specifications are so drawn as to rule out most mines even in the areas covered.

Refractories . . .

Refractories Prices, Page 161.

Pittsburgh—Brick makers await OPS approval of a projected price boost on all grades of brick to cover increased raw materials and labor costs. Industrial construction has caused shortage of both basic and acid brick.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, manufacturing building, Hyatt Roller Bearing Division, General Motors Corp., Clark township, New Jersey, to Harris Structural Steel Co., New York.

1800 tons, taintor gates, Chief Joseph dam, Washington state, to Consolidated Western Steel Corp., Seattle.

1000 tons, hangar, Eielson Air Force base, Alas-

ka, partly furnished by government, balance awarded Pacific Car & Foundry Co., Seattle, Peter Kiewit Sons Co., Seattle, general contractor.

700 tons, power house, Rock Island dam, Washington state, to Mississippi Valley Structural Steel Co., through Stone & Webster Engineering Corp., Boston, engineer-contractor.

200 tons, telephone building, Spokane, Wash., to Union Iron Works, Spokane.

200 tons, anchorage steel-tower material, to Creamer & Dunlap, Tulsa, Okla., by Bonneville Power Administration, Portland, Ore.

200 tons, hangar, McChord field, Washington state, to Continental Steel Co., Los Angeles; J. H. Sellers, Seattle, general contractor.

200 tons, hangar, Paine field, Washington state to Continental Steel Co., Los Angeles; Teufel & Co., Seattle, general contract.

188 tons, roof panels, Alaska Railroad power plant, Anchorage, Alaska, to Detroit Steel Products Co., Detroit; Morrison-Knudsen Co., Seattle, general contractor.

100 tons, school building, Hartford, Vt., to Vermont Structural Steel Co., Burlington, Vt.; H. P. Cummings Construction Co., Ware, Mass., general contractor.

100 tons, junior high school, Stratford, Conn., to Port Chester Iron Works, Port Chester, N. Y.; E. & F. Construction Co., Bridgeport, Conn., general contractor.

STRUCTURAL STEEL PENDING

6700 tons, contract 3, viaduct superstructure, Major Deegan state expressway, New York; bids Aug. 15.

4880 tons, Gilmore street bridge, Jacksonville, Fla.; bids closed.

4500 tons, Washington state, Pasco-Kennewick highway bridge; bids to Olympia about Oct. 1.

2000 tons, state bridge, Montgomery county, Pennsylvania; Conduit & Foundation Corp., Philadelphia, low on general contract.

1200 tons, two Army warehouses, Mt. Ranier ordnance depot, Washington state, bids to U.S. Engineer, under tabulation.

1000 tons, eight bridges, expressway, Fall river, Freetown, Mass.; bids Aug. 14, Boston.

930 tons, state bridge program, Cumberland and York counties, Pennsylvania; bids Aug. 24.

700 tons, Whittier, Alaska, power plant; bids rejected, second call in early August.

685 tons, state highway bridges, Leominster, Mass.; Bayer & Mingolla Construction Co., Worcester, Mass., low.

450 tons, central research building, American Smelting & Refining Co., Plainfield, N. J.; bids Aug. 6.

183 tons, state bridge, Fulton county, Pennsylvania; bids Aug. 24.

100 tons, state bridge, Lancaster county, Pennsylvania; Conestoga Construction Co., Rohrerstown, Pa., low on general contract.

Unstated, miscellaneous plant construction for Du Pont interests, Martinsburg, W. Va.; bids asked.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1250 tons, Rock Island dam, Washington state to Columbia Steel Co., through Stone & Webster Engineering Corp., Boston, engineer-contractor.

700 tons, Ladd Air Field Hospital, Alaska, to Northwest Steel Rolling Mills Inc., Seattle; Grove, Shepherd, Wilson & Kruge, Seattle, general contractors.

275 tons, junior high school, Stratford, Conn., to Fireproof Products Corp., New York; E. & F. Construction Co., Bridgeport, Conn., general contractor.

200 tons, Washington state highway bridges, King county, to Northwest Steel Rolling Mills Inc., Seattle.

150 tons, Fort Richardson air base laundry, Alaska, to Northwest Steel Rolling Mills Inc., Seattle; J. C. Boespflug Co., Seattle, general contractor.

REINFORCING BARS PENDING

500 tons, administration building, Fort Richardson, Alaska; general award to J. H. Pomeroy & Co., Seattle, low $1,983,000.

Unstated, two 750-man barracks, Elmendorf field, Alaska; bids to U.S. engineer, Aug. 21.

Unstated, Bigg Cliff dam and completion Detroit dam power house, Oregon state; low bid $7,397,547 rejected; U.S. Engineer will negotiate.

PIPE . . .

CAST IRON PIPE PLACED

1400 tons, 24 and 16-inch cast iron pipe, Bothell Way improvement project, Seattle, to H. G. Purcell, Seattle, for U.S. Pipe & Foundry Co., Burlington, N. J.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian National, three 1200-hp road units, to General Motors Diesel Ltd., London, Ont., and one 1000-hp switching unit, to the American Locomotive-General Electric Companies, Schenectady, N. Y.; latter is for operation on the Central Vermont.

Erie, 15 diesel-electric locomotive units, with one 1500-hp freight, three 1500-hp road switching and four 1000-hp switching units to Electro Motive Division, General Motors Corp., La Grange, Ill.; four 1600-hp road switching and one 1000-hp switching units to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.; two 1600-hp road switching and one 1000-hp switching units to American Locomotive-General Electric Companies, Schenectady, N. Y.

Ontario Northland, eight 1600-hp diesel-electric road switching units, to Montreal Locomotive Works, Montreal.

The Utah, three 1600-hp diesel-electric road switching units, to American Locomotive-General Electric Companies, Schenectady, N. Y.

RAILROAD CARS PLACED

Wabash, 100 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago, and 50 seventy-ton gondolas, to Greenville Steel Car Co., Greenville, Pa.

RAILROAD CARS PENDING

Cleveland Transit System, 70 rapid transit cars, bids to be asked; cost $55,000 each.

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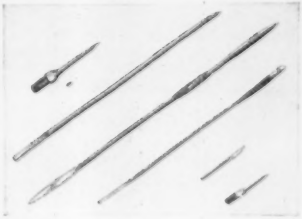

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Copco Buys Iron Works

Copco Steel & Engineering Co., Detroit, acquired all the outstanding stock of Edwards Iron Works Inc., South Bend, Ind. Edwards is engaged in the manufacture of commercial freight trailers, fabricated assemblies of various kinds, structural steel fabrication and a general steel warehouse business. The company becomes a wholly-owned Copco subsidiary and will continue in the same line of business under the same management and general policy. William H. Edwards will continue as president and general manager of Edwards Iron Works Inc.

Western Electric To Build

Western Electric Co., New York, will erect an assembly and distribution plant in Syracuse, N. Y. Construction is scheduled to begin this fall.

Marshall Railway Equipment

Newhall-Marshall-Wood Inc., New York, changed its name to Marshall Railway Equipment Corp. The company deals in new and used railroad cars, tank and car parts, locomotives, steel storage tanks and industrial equipment.

Hanna Renames Steamer

M. A. Hanna Co. renamed the steamer *Fred G. Hartwell* to *Matthew Andrews* in honor of Matthew Andrews, who was chairman of the Hanna board from 1922 until his death in 1929. Mr. Andrews had been previously a partner in M. A. Hanna & Co., predecessor of the M. A. Hanna Co. *Matthew Andrews* is the largest of 13 bulk freighters operated by Hanna and has established many records.

GM Building Syracuse Plant

Construction of a large General Motors Corp. plant on Town Line road, Syracuse, N. Y., for the production of stator blades for jet engines has been started. The structure will have 400,000 square feet of floor space.

Forms Ontario Foundry Co.

A partner and two employees of Seneca Foundry, Geneva, N. Y., purchased the Crown Mfg. Co., Phelps, N. Y., and will open a foundry business there under the name of the Ontario Foundry Co. Partners in the new firm are Michael Canulli, Mrs. Helen Canulli and John Mahoney. The Phelps buildings are now being readied for foundry operations. Seneca Foundry's plant, scene of a fire several weeks ago, will not be rebuilt.

Whitney To Build in Texas

Whitney Chain Co., Hartford, Conn., will build a plant in Longview, Tex. An application for a certificate of necessity, filed last March, listed estimated cost at $4,796,000.

Rheem Buys Graham Mfg. Co.

James Graham Mfg. Co., Newark, Calif., was acquired by Rheem Mfg. Co., New York. Graham was founded as a supplier of foundry products for railroads and is well known for its line of gas ranges. Its business will be continued under management of Clarence Graham Sr., son of the founder.

C. Lee Cook Mfg. Expands

C. Lee Cook Mfg. Co. Inc., Louisville, is expanding its facilities for production of metallic rod packings and graphitic iron piston rings. Present capacity will be increased about 50 per cent.

Homak Buys Furniture Firm

Homak Mfg. Co., Chicago, purchased the building and machinery of Bell Metal Products Co., that city, for the manufacture of kitchen furniture. S. H. Danziger is president of Homak Mfg. Co.

Foundry Products Division

Werner G. Smith Co. Division, Archer-Daniels-Midland Co., Cleveland, changed its name to Foundry Products Division, Archer-Daniels-Midland Co.

Stronghold Buys Rivco Inc.

Stronghold Pacific, western division of Stronghold Screw Products Inc., Chicago, acquired ownership of Rivco Inc., Downey, Calif., manufacturer of rivets and screws for the automotive and aircraft industries. B. J. Sackheim is president of Stronghold.

Griffin Plans Alterations

Griffin Mfg. Co., Erie, Pa., secured permits for $100,000 in alterations to its factory and office.

Levinson Steel Expanding

Levinson Steel Co., Pittsburgh, is embarking on a $1,057,000 expansion program which will increase its fabricating facilities 25 per cent. Program consists of four buildings adjoining the company's present operations, two of which are un-

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der construction. The entire project is scheduled for completion by June, 1952.

Avondale Buys Foundry

Avondale Marine Ways Inc., Avondale, La., acquired all properties and facilities of Service Foundry, New Orleans. The new foundry division is equipped with some of the largest machine tools in the southern states. Electric steel castings weighing up to 11,000 pounds can be cast in the foundry. James H. Bull is president of Avondale.

Worthington Pump Moves

Sales and engineering functions of the water treating section of Worthington Pump & Machinery Corp., Harrison, N. J., were moved from the company's Dunellen, N. J., plant to its Harrison plant.

Chicago Steel Service Co.

Chicago Steel Service Co., large independent distributor of stainless and carbon steel, moved into its new general offices and warehouse on Kildare avenue and 45th street, Chicago. The $1.5 million warehouse is equipped with the latest developments in materials handling as well as equipment to process orders for special shapes and sizes.

Continental Buys Dixon Mfg.

Continental Can Co., New York, bought the Dixon Mfg. Co. Inc., Coffeyville, Kans., contract manufacturer of aircraft components. William M. Cameron, vice president, Continental's Central (Metal) Division, is also president of this new wholly-owned subsidiary. W. O. Dixon, former president, will continue as general manager. Continental plans to expand facilities in Coffeyville to handle additional contracts which are now being negotiated.

Metals Processing Division

Metals Processing Division, Curtiss Wright Corp., New York, has been organized in Buffalo. The division will apply newly developed methods to make essential materials and products for aircraft. The new division will be the sixth operating unit of the company.

S K F Industries Expands

Construction is under way in the $10 million plant expansion, equipment and machinery replacement program of S K F Industries Inc., Philadelphia. This large producer of ball and roller bearings is adding to its Philadelphia plant No. 1 a laboratory addition, new building to house finished stores, bridge connecting main factory building with new addition; is building an addition to its Shippensburg, Pa., plant to step-up production of retainers; is expanding its Philadelphia No. 2 plant to provide new and larger heat-treating facilities, and increase manufacturing capacities for spherical and cylindrical bearings.

To Make Gas Appliance Items

With purchase of Grayson-Greenamyer Inc., Monrovia, Calif., for a reported $750,000, General Controls, Glendale, Calif., will start manufacture of water heaters, thermostatic and safety controls for gas appliances.

Forms Dresser Equipment Co.

Kobe Inc. and International Derrick & Equipment Co., Los Angeles, have been merged to form Dresser Equipment Co., a subsidiary of Dresser Industries Inc., Dallas. They were formerly operated as separate subsidiaries of Dresser Industries and will now be operated as the Kobe Division and Ideco Division, respectively, of Dresser Equipment Co.

Steel Distributor Expands

William G. Wetherall Inc., Baltimore, acquired five acres of land at Cherry Hill road near Waterview avenue, Westport, where it will erect a larger iron and steel ditsributing warehouse than it now occuipes. Joseph A. Doyle Jr. is president.

To Build Electronics Plant

General Precision Laboratory Inc., manufacturer of electronic equipment and a subsidiary of the General Precision Equipment Corp., New York, purchased 3½ acres at Pleasantville, N. Y., for the erection of a two-story plant, which is expected to be finished early next year.

Yoder Building Tube Mill

An electric resistance-weld tube mill with a capacity for making line pipe and casing in sizes from 4½ inches up to 16 inches outside diameter, in thicknesses ranging up to 9/16 inch is being constructed by The Yoder Co., Cleveland, for Lone Star Steel Co., Dallas. This will be one of the largest electric resistance-weld pipe and tube mills ever built. Its cost will exceed $3 million, not including installation.

Plans Long-Range Expansion

Preparing for an extensive long-range expansion program, National Lock Co., Rockford, Ill., subsidiary of Keystone Steel & Wire Co., Peoria, Ill., purchased a 174-acre tract of land south of Rockford. Elco Tool & Screw Co. and Rockford Screw Products Co. also

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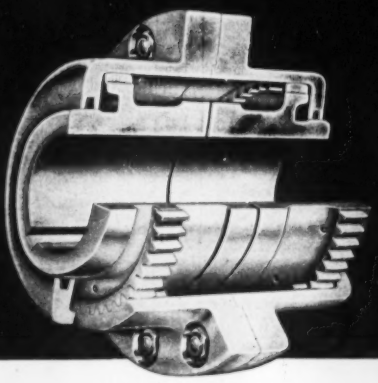

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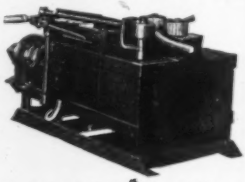

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have purchased land in the same general area. Development of National Lock's property will depend upon engineering studies now being made. Storage, manufacturing and parking space is needed by the company.

Forms Metal Treating Firm

Allied Metal Treating Corp. was incorporated in Milwaukee by Charles I. Wesley, Evan C. Schwemer and Glen A. Schwemer. The company may ultimately represent an investment of $2.5 million. The company has an initial capitalization of $500,000. The company plans to build an administration building and a metal treating and electroplating plant in Pleasant Prairie, near Kenosha, Wis.

Black & Decker Mfg. Co.

Black & Decker Mfg. Co., Towson, Md., completed foundation work on its branch plant at Hampstead, Carroll county. The proposed plant will comprise 100,000 square feet. It is scheduled to be ready for occupancy by early next spring.

Will Build Turbine Plant

John Inglis Co. Ltd., Toronto, which has received a contract for production of marine steam turbines from the Department of Defense Production, will erect a new plant in Scarborough township, to have 150,000 square feet of floor space. This is the first unit in the company's expansion program. The steam turbines will be produced to the design of the English Electric Co., which holds a 51 per cent interest in the John Inglis Co. Ltd.

Binks Moves Seattle Branch

Binks Mfg. Co.—spray guns, spray finishing equipment, cooling towers and spray nozzles—Chicago, moved its Seattle branch to larger quarters at 2120 Fourth Ave. James C. Level is sales engineer and manager of this office.

Hydraulic Research Builds

Hydraulic Research & Mfg. Co., Burbank, Calif., will construct an 8400 square foot plant in that city. Completion is scheduled by September.

American Cyanamid Expands

An expansion of facilities for production of basic chemicals at plants in Niagara Falls and Welland, Ont., is planned by North American Cyanamid Ltd., a subsidiary of American Cyanamid Co., New York. A further step in the expansion program will be installation of equipment which will increase the latter company's capacity for production of melamine at Willow Island, W. Va.

Martin Leases Storage Space

Glenn L. Martin Co., Middle River, Md., maker of airplanes and parts, leased 30,000 square feet of storage space at 215-217 W. Pratt St., Baltimore. The company has an order book of more than $400 million.

Opens Charleston Warehouse

Ray Miller, Newark, N. J., opened a branch warehouse at 4230 Kanawha Turnpike, South Charleston, W. Va. Stocks of stainless, rubber, plastic, aluminum and other resistant pipe, valves and fittings, covering the entire field of resistant materials required for chemical piping and processing, will be carried. Stanley Polan is manager of this operation.

Westinghouse Acquires Firm

Westinghouse Electric Corp., Pittsburgh, purchased the Plywoods Plastics Corp., Hampton, S. C. Production of plywood and doors will be supplemented by the manufacture of laminated plastics and molded composition plastic products to be used in apparatus manufactured in various Westinghouse plants.

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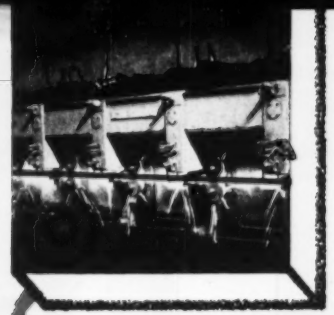

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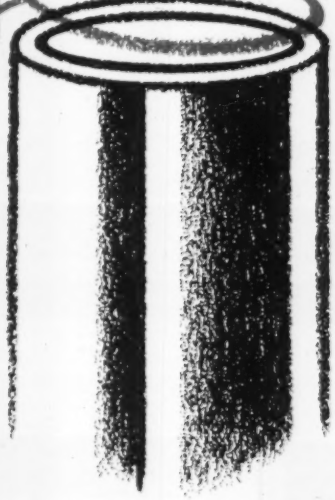

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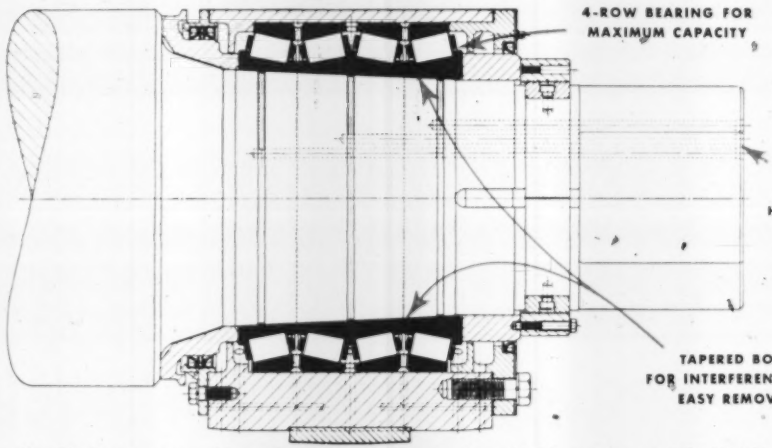
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